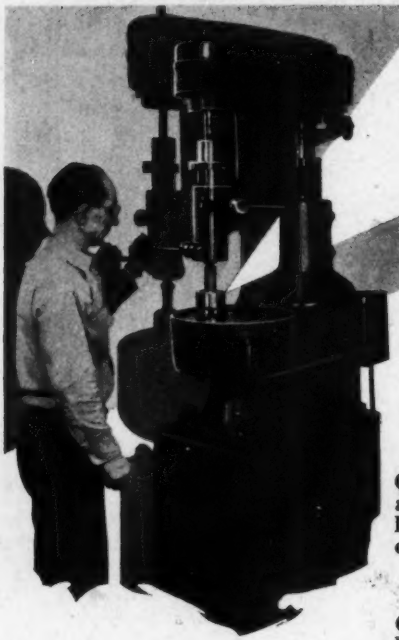
efrigeration Service Engineer

L. 15 NO. 3 MARCH · 1947

PARKMAN BRANCH

CHICAGO SEALS



with

PRECISION LAPPED SURFACES

Combining highest human skil and scientific precision machin lapping, CHICAGO SEALS are ac curately finished to

MILLIONTHS OF AN INCH

Careful inspection assures th highest quality and trouble-fre operation.

FOR BETTER PERFORMANCE USE

CHICAGO VALVE PLATES

SOLD THROUGH LEADING

PERFECT BALANCE

Chicago Seals
MODERN DESIGN

CHICAGO SEALS

REFRIGERATION WHOLESALERS

CHICAGO SEAL CO. 20 N. WACKER DR., CHICAGO 6, IL

THE REFRIGERATION SERVICE ENGINEER, Nickerson & Collins Co., Publishers, 435 N. Waller Ave., Chicago 4
Published monthly, Vol. 15, No. 3, March, 1947. Entered as second class matter March 4, 1936, Chicago, Ill., the Act of March 3, 1879. Subscription in the United States, $2.00 per year; all other countries, $3.00 pe

KNOW YOUR REFRIGERANT CORROSION LIMITS

EFFECTS OF MOISTURE

Moisture in a refrigerating system may cause any or all of the following:

1. Freezing up at expansion valve or capillary tube, ice in the evaporators.
2. Corrosion of metals to form sludge.
3. Copper Plating.

RESULTS OF TESTS CONDUCTED ON STEEL

Refrigerant	% Water by Weight	Results
Sulfur Dioxide	0.03	Slight discoloration
	0.10	Slight scale
	0.15	Heavy scale
		Presence of air did not affect results
Methyl Chloride	0.02	Slight discoloration
	0.03	Marked discoloration
		Very slight scale
	0.05	Moderate to heavy scale
		Presence of air increased corrosion in all cases
"Freon-12"		Similar to methyl chloride

FACTS REVEALED

1. Corrosion of metals occurs whenever the amount of water present exceeds fairly well defined limits.
2. Water reacts with sulfur dioxide, methyl chloride, "Freon-12" and other refrigerants to form acids.
3. These acids react with steel, copper, and aluminum parts of a refrigerating system to form definite metallic salts (sludges).
4. In a sulfur dioxide system the amount of moisture tolerable is higher than in a methyl chloride or "Freon-12" system but corrosion, once begun, proceeds more rapidly in a sulfur dioxide system.
5. Corrosion in a butane or isobutane system is due to the direct action of the water and perhaps air, on metals.
6. Moisture tolerances are higher for copper, brass and aluminum than for steel.
7. Moisture tolerances are lower at higher temperatures found in condenser and compressor than at room temperature.
8. Corrosion is much worse in the presence of air in all refrigerants except sulfur dioxide.
9. Approximately 90% of the sludges produced in refrigerating systems are due to moisture; the others are associated with oil and minor causes.

LIQUID Sulfur Dioxide BY ANSUL®

LIQUID Methyl Chloride BY ANSUL®

®REG. U.S. PAT. OFF.

SEND FOR THIS BULLETIN

An informative reprint, "MOISTURE and DRYING METHODS," will be sent on request. No obligation. Send for it today.

ANSUL WHOLESALERS are ready and equipped to render an intelligent, cooperative service to refrigeration engineers and maintenance men on problems which arise from time-to-time in the operation of refrigerating systems.

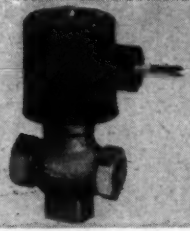
ANSUL REFRIGERANTS ARE AVAILABLE AT LEADING WHOLESALERS EVERYWHERE

ANSUL CHEMICAL COMPANY

REFRIGERATION DIVISION, MARINETTE, WISCONSIN

DISTRIBUTORS FOR KINETIC'S "FREON 11" "FREON 12" "FREON 21" "FREON 22" AND "FREON 113"

BRILLIANT MEMBERS OF THE "DETROIT" TEAM



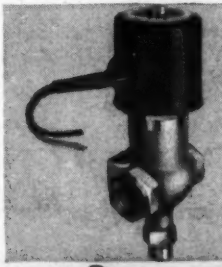
No. 683-3

This refrigerant valve, like all "Detroit" Solenoids is designed for use with any liquid not injurious to brass. Furnished with three sizes of orifices, 1/8", 7/16", and 7/32".

Nominal capacity—liquid line

1/8" orifice	1½ tons Freon-12	3½ tons Methyl
7/16" orifice	3 tons Freon-12	6½ tons Methyl
7/32" orifice	3¼ tons Freon-12	6¼ tons Methyl

⅜" female N.P.T. connections.



No. 681

The No. 681 is of the pilot operated type and requires a minimum pressure drop of 1 psi to operate the piston.

Nominal capacity—liquid line

7½ tons Freon-12—17 tons Methyl

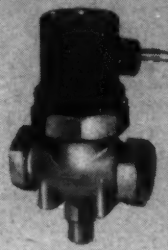
½" female N.P.T. connections.

"DETROIT" SOLENOID VALVES *for* Refrigerants · Water · Air

"Detroit" Solenoid Valves, designed expressly for refrigeration and air conditioning work, are the result of many years' experience with all types of refrigeration valves.

Their performance is of the same exceptional quality found in "Detroit" Expansion Valves such as No. 673. "Detroit" Solenoid Valves are brilliant members of the "Detroit" Team.

"Detroit" Solenoid Valves are brilliant members of the "Detroit" Team.

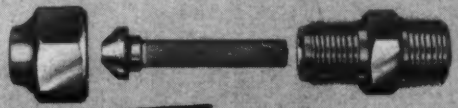


No. 686

The No. 686 is a heavy duty, large capacity pilot operated valve which requires a pressure drop of 1⅜ psi to operate the piston when used with refrigerants. 5 psi on water. It is made with 2 sizes of orifice, ½" and ⅝".

Nominal capacity—liquid line

½" orifice	11 tons Freon-12	23 tons Methyl
⅝" orifice	17 tons Freon-12	34 tons Methyl



No. 685 Strainer

Fits any Threaded Solenoid Valve. Fine mesh strainer of Monel metal to resist corrosion. Slips into adapter tube, and is held in place by tubing and hex nut. Adapter tubes furnished with three sizes of connections to valve, and six sizes of tubing connections:

Adapters with ⅛", ¼" or ⅜" SAE tubing connections are available with ⅜" MPT Valve connections.

Adapters with ¼" or ⅜" SAE tubing connections are available with ½" MPT Valve connections.

Adapters with ⅜" or ½" SAE tubing connections are available with ¾" Valve connections.

Cleaning or replacing strainer element very easy—just unscrew the hex nut.

POWERFUL They will lift against high pressures.

QUIET Design of plunger and guide tube minimizes or eliminates objectionable A-C hum.

DURABLE Moistureproof coils, bodies of non-porous cast brass, long wearing needles and seats give these valves exceptionally long life.

EASILY INSTALLED Substantial mounting boss on valve body provides easy means for rigid mounting.

EASILY SERVICED Easily disassembled and cleaned without disconnecting refrigerant lines or wiring.

POSITIVE CLOSING Non-magnetic needle and seat and strong "kick off" spring assure tight closing.

ECONOMICAL Low current demand (15 watts open on largest valve). Replacement parts if required are inexpensive.

FOUR WIRE COIL A four lead coil is available on any "Detroit" Solenoid Valve, for either 115 or 230 volt use.

DETROIT LUBRICATOR COMPANY

"Detroit" Heating and Refrigeration Controls • Engine Safety Controls • Safety Float Valves and Oil Burner Accessories • "Detroit" Expansion Valves and Refrigeration Accessories • Stationary and Locomotive Lubricators

DETROIT

General Offices: 5900 TRUMBULL AVENUE, DETROIT 8, MICHIGAN

Division of AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

Canadian Representative — RAILWAY AND ENGINEERING SPECIALTIES LIMITED, MONTREAL, TORONTO, WINNIPEG

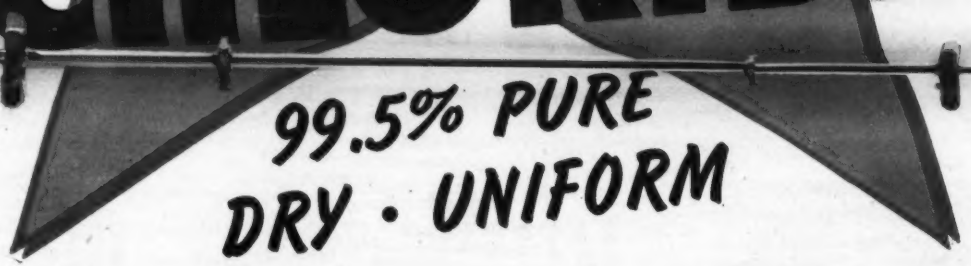
To Meet Your Refrigeration Needs

"Artic"

DU PONT

METHYL

CHLORIDE



HIGH-PURITY Du Pont Methyl Chloride will meet your refrigeration requirements.

ORDER WHAT YOU NEED—NOW! It's available from wholesalers' stocks in principal cities.

RETURN CYLINDERS PROMPTLY—Help assure yourself and others rapid deliveries.

For technical information, write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Del.

DISTRICT SALES OFFICES: ***Electrochemicals Dept.*** Baltimore, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, El Monte, New York, Philadelphia, Pittsburgh, San Francisco; And ***Ammonia Dept.:*** Offices in New York. Philadelphia, Chicago, St. Louis

DU PONT METHYL CHLORIDE SPECIFICATIONS

Purity	99.5% Methyl Chloride
Moisture	0.008% by wgt. max.
Acid as (HCl)	0.001% by wgt. max.
Residue on Evaporation	0.01% by wgt. max.
Boiling Range (760mm)	—24.6° to—23.6°C.
Color	water white, clear

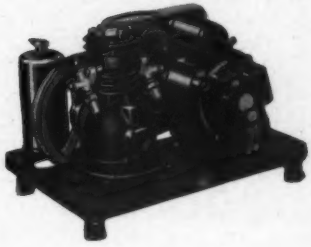
DU PONT ELECTROCHEMICALS

DU PONT BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

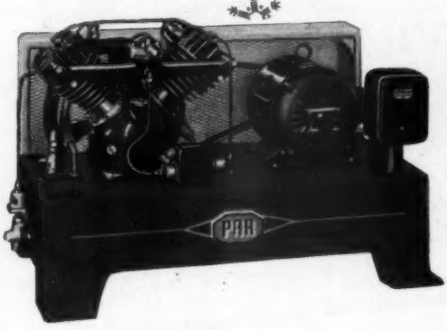
HELPING YOU—
That's His Business
You might say the VIRGINIA Refrigeration Equipment Wholesaler is your partner in business. On his shelves for immediate delivery are 4,000 different refrigeration items from more than 200 different refrigeration manufacturers. He is a good man to know. Ask him about VIRGINIA Refrigerants—
EXTRA DRY ESOTOO
(Liquid Sulfur Dioxide)
V-METH-L
(Methyl Chloride)
If you don't already know him, let us introduce you; mail the coupon today.
MAIL THIS COUPON NOW
VIRGINIA
VIRGINIA
SMELTING COMPANY
WEST NORFOLK, VIRGINIA
NEW YORK • BOSTON • DETROIT
Distributors of "Freon" Refrigerants 11, 12, 21, 22, 113
VIRGINIA SMELTING COMPANY — Dept. RS-96
WEST NORFOLK, VA.
Gentlemen:
Please give me the name of the VIRGINIA wholesaler nearest me.
Name..... Position.....
Firm.....
City..... Zone..... State.....

PAR REFRIGERATION UNITS

from ⅛ H. P. Close-Coupled Units



to 5 H. P. Heavy Duty Commercial Units . . . . . provide a wide variety of models and sizes for "tailored" installations. With Par there's a proper size to fit every application . . . giving balanced performance for economy and efficiency. And Par's many outstanding features of construction assure dependable, trouble-free service. Know more about Par—see your Par wholesaler or write for illustrated catalog R-98.



PAR—Condensing Unit Line sold exclusively through Franchised Refrigeration Equipment Wholesalers!

. . . By Comparison — You'll Buy PAR

Lynch Manufacturing Corporation

General Offices, Toledo 1 • Factory, Defiance, Ohio, U.S.A.

For Profitable
Trouble-Free Replacements

CAPACITRON

Motor Starting Capacitors

Handy New Replacement Guide

•

Contains Hundreds of Important Listings, Capacitor Service Information and Helpful Installation Notes

•

Get a Free Copy from Your Jobber or Write Direct

The CAPACITRON *Company*

849 N. KEDZIE AVENUE **CHICAGO 51, ILLINOIS**

TELEPHONE VAN Buren 3322

BUY CAPACITRONS THROUGH YOUR LOCAL JOBBER

NOW

Triple-Seal Flare Fittings and Dryseal Pipe Threads . . .

. . . give you extra protection against leakage

• Here is a fine combination that brings you new extra protection against leakage in refrigeration tubing connection work.

First, the *Imperial Triple Seal Flare Fitting* has a groove in the seat. When the flare is drawn against this groove the copper tubing is extruded into the groove making a tight, self-sealing joint. Here is the joint that remains leak-proof even though the face of the seat may be nicked or marred. On all sizes 3/8" and larger.

Now, full length SAE *Dryseal Pipe Threads* on pipe connections provide still further protection against leakage. These improved pipe threads eliminate clearance between roots and crests of threads; assure tight joints. They are longer on sizes 1/4" and over; this is especially valuable in reconnecting.

Today, more than ever before, the Imperial Diamond "I" on fittings is your assurance of top quality.

(Left) Ordinary flare fittings have only one seal.

(Right) Imperial Triple-Seal Flare Fittings have three seals to give you new, extra protection against leakage.

See Your Jobber

THE IMPERIAL BRASS MFG. CO.
534 S. Racine Ave., Chicago 7, Ill.

IMPERIAL

FITTINGS • VALVES • FILTERS • DEHYDRATORS • FLOATS • • CHARGING LINES • TOOLS FOR CUTTING, FLARING, BENDING, COILING, PINCH-OFF, SWEDGING

Is the System WET or DRY?

DON'T GUESS...KNOW!

DFN MOISTURE INDICATOR*

tells quickly...on the job, with laboratory accuracy

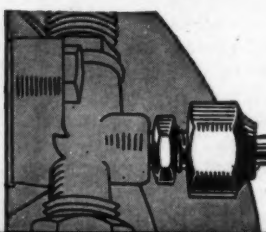
Quick . . . simple . . . low-cost method of detecting moisture in Freon and Methyl Chloride Systems

THE new DFN Moisture Indicator is a big time-and-money-saver on service calls—in the shop—on new installations. It tells quickly whether moisture is the cause of troubles and shutdowns—assures that a system is dry when you finish installation or servicing, to prevent call-backs.

The DFN Moisture Indicator is easily, quickly installed to gauge connection. The indicating cartridge (containing specially processed "Drierite") quickly tells the degree of moisture, if any. No need to shut down unit. Indicates accurately between 0° and 160° F. operating temperature. Packed in handy metal service kit. Ask your jobber for details—or write for literature and prices.

To KEEP systems dry, use DFN DEHYDRATORS

● 100% drying efficiency proved by repeated tests with DFN Moisture Indicator. Cartridge type—angle type—non-refillable type—hermetic system type.



*PAT. APPL'D FOR

McINTIRE CONNECTOR CO.

Makers of DFN Dehydrators, Filters, Strainers

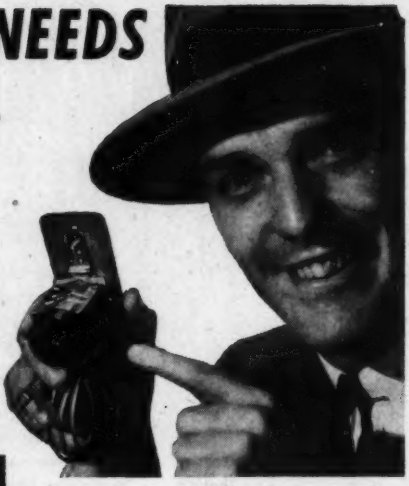
255 Jefferson St. **Newark 5, N. J.**

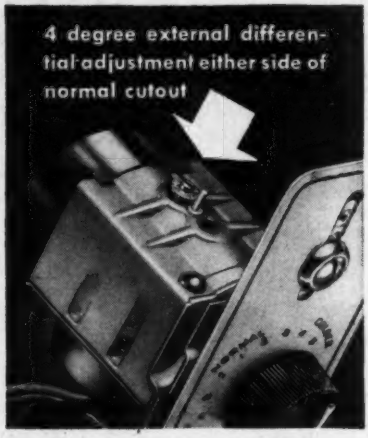
"Br-r-r-r-r!
IT'S FREEZING!"
● You bet it's freezing. Not only that, it's faster freezing! And that's what warms up the hearts of customers who have PEERLESS FLASH PLATES in their locker plants and similar installations. They like that faster freezing, the lower operating and maintenance cost! They like the superior performance for less given by PEERLESS FLASH PLATES and they become lifetime customers of the dealers who provide this superior refrigeration. That's why Peerless of America, Inc., is now producing huge quantities of the new PEERLESS ZERO and SUB-ZERO FLASH PLATES. They're in demand!
PEERLESS FLASH PLATES are available in quantity for YOUR installations. Specify them for all low temperature applications. Non-ferrous high conductivity and UNIFORM distribution of refrigerant throughout each plate does the trick — insures that fast action and low operating cost. Continuous tubing eliminates leaks. The gleaming aluminum finish is handsome and durable. Light weight, approximately 2½ lbs. per square foot, cuts shipping and handling cost.
PLATES IN BANK FORMATION
NEW PEERLESS FLASH PLATE
PLATES IN BANK FORMATION
Investigate other PEERLESS products. You'll find you get superior performance with every one. Why? Because always "Peerless is Priceless in Quality!"
SOLD THROUGH LEADING REFRIGERATION SUPPLY WHOLESALERS
PEERLESS of AMERICA, Inc.
General Sales Offices
2901 LAWRENCE AVE. CHICAGO 25, ILLINOIS

FILLING ALL NEEDS

The Cutler-Hammer Line of REFRIGERATION REPLACEMENT CONTROL

This One Universal unit alone covers 60% of all needs.





Bul. 9521N9

Adjustable Mounting Brackets

Maximum Mounting Centers..... 4-3/16
Minimum Mounting Centers..... 2-3/16

Adjustable Cutout Feature—Differential can be increased 4 degrees by turning indicator in "HI" direction and decreased 4 degrees by turning in "Lo" direction.

Adjustable Range—Turning screw clockwise lowers settings and counter-clockwise raises settings.

Operating knob can be adjusted to meet various evaporator scale settings. New knob is ideal for varying shield thicknesses. Makes *this* control adaptable to wider range of single dial replacement jobs where overload is not required in unit.

The Cutler-Hammer line of Refrigeration Replacement Control will meet all the refrigeration serviceman's requirements. One Cutler-Hammer Control Unit alone . . . the *Universal* Replacement unit . . . will handle 60% of his needs. And where exact replacement control is needed, that item also will be found in the C-H Exact Replacement Control line . . . individually packed, clearly labelled, complete with dial plate, mounting screws, trim washers and full instructions for mounting and adjustment.

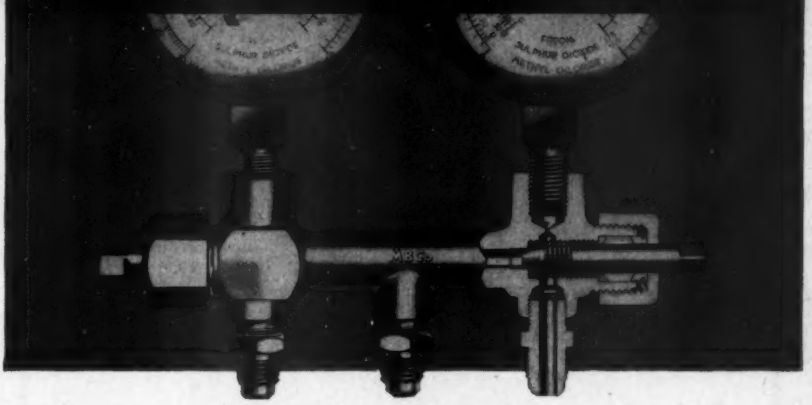
Behind this line are 50 years of control specialization and thorough knowledge of merchandising requirements. Thus, the line is recommended by outstanding refrigeration wholesalers from coast to coast and alert service organizations everywhere use it to reduce investment in stock, to insure regular and rapid turnover, faster completion of the job, and greater all-round satisfaction. CUTLER-HAMMER, Inc., 1363 St. Paul Ave., Milwaukee 1, Wisconsin.

CUTLER-HAMMER
MOTOR CONTROL
C-H

DOMESTIC, SEMI-COMMERCIAL AND COMMERCIAL CONTROL

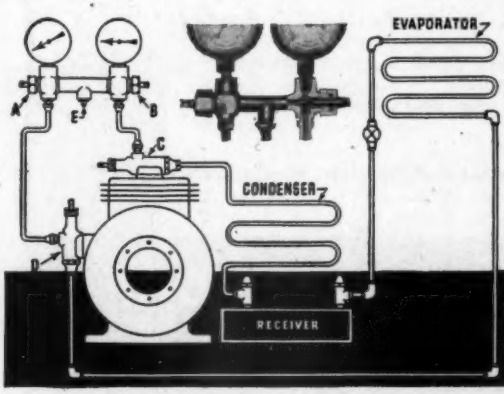
MUELLER BRASS CO. TESTING MANIFOLD

A Handy Tool for the Serviceman



The Mueller Brass Co. Testing Manifold is a service tool. It enables a service man to quickly install pressure gauges to diagnose trouble, and facilitates charging, purging, adding oil, etc.

This device allows the service man to watch the pressure gauges during charging and purging. It saves considerable time on almost any service work that must be done on the compressor.



DIRECTIONS FOR USE

1. To Observe Operating Pressures
Valve A—Closed Valve B—Closed
Valve C—Back Seat Cracked Open
Valve D—Back Seat Cracked Open

2. To Charge Refrigerant Through Compressor
Connect Refrigerant Drum to E
Valve A—Open Valve B—Closed
Valve C—Back Seat Cracked Open
Valve D—Closed—Front Seated

3. To Purge Receiver
Connect Purge Line to E
Valve A—Closed Valve B—Open
Valve C—Back Seat Cracked Open

4. To Charge Liquid Into High Side
Connect Refrigerant Drum to E
Valve A—Closed Valve B—Open
Valve C—Mid Position

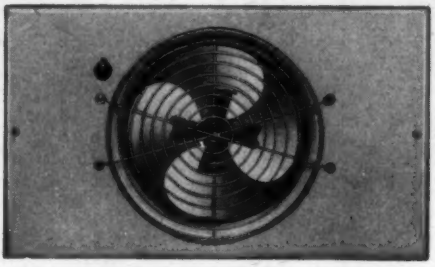
5. To Build Up Pressure in Low Side for Control Setting or to Test for Leaks
Seal E with Seal Cap
Valve A—Open Valve B—Open
Valve C—Back Seat Cracked Open
Valve D—Mid Position

6. To Charge Oil Through Compressor
Connect Oil Supply to E
Valve A—Open Valve B—Closed
Valve C—Open—Back Seated
Valve D—Closed—Front Seated

MUELLER BRASS CO.
PORT HURON, MICHIGAN

Filterpure

FOR REACH-INS
WITH AIR PURIFICATION



A CEILING UNIT
completely NEW and DIFFERENT

Controlled Air Movement . . . Small and Compact . . . Air Purification . . . Sensibly Priced. Made in 3 sizes to balance 1/4, 1/3 and 1/2 H.P. Compressors.

Sold by Leading Refrigeration Wholesalers

BETZ CORPORATION
HAMMOND, INDIANA

Look for these features in a temperature control!

MOUNT AT ANY ANGLE OR POSITION

FULLY ENCLOSED STURDY SWITCH

DIFFERENTIAL CONSTANT THROUGHOUT RANGE

DIALS ACCURATELY CALIBRATED IN DEGREES FAHRENHEIT

SETTINGS EASILY AND QUICKLY MADE WITH SCREW-DRIVER

ACCURATE AT ANY TEMPERATURE IN DIAL RANGE

White-Rodgers Hydraulic-Action Temperature Controls offer you all these advantages and more! Accepted as standard by leading manufacturers of refrigerating and air-conditioning equipment, they offer you benefits you can't afford to overlook.

Have you received your copy of the new White-Rodgers Refrigeration Control Catalog? Send for your copy today.

WHITE-RODGERS ELECTRIC CO.

ST. LOUIS 6, MISSOURI

Controls for Refrigeration • Heating • Air Conditioning

REFRIGERATION
SUPPLY DEPOT
Your Pointer
TO QUALITY
There's one of Kelvinator's 50 supply depots near you, carrying a complete line of refrigeration parts and supplies . . . answering a long-felt need in the refrigeration supply field.
Quality products, competitively priced—ready for delivery if you call, or mailed promptly on receipt of your order at the Kelvinator depot in your vicinity.
Kelvinator
DIVISION OF NASH-KELVINATOR CORPORATION, DETROIT
CONDENSING UNITS
REFRIGERATION PARTS AND SUPPLIES
BUY KELVINATOR FOR ALL YOUR REFRIGERATION REQUIREMENTS

ALCO THERMO-LIMIT VALVE

LAST YEAR'S IMPROVEMENT

*

THIS YEAR'S STANDARD

The THERMO-LIMIT has now proved its worth in tens of thousands of refrigeration systems. It combines all the advantages of liquid- and gas-charged valves:

- PRESSURE LIMITING. Prevents motor overload.
- INTERCHANGEABLE PRESSURE LIMIT. Various pressure "cartridges" can be easily replaced in the field.
- LIQUID-CHARGED. Positive control — can be installed in ANY location or position.
- INTERCHANGEABLE CAPACITY. Various cage assemblies can be easily exchanged in the field.
- EXTERNAL ADJUSTMENT. Change of super-heat does not affect pressure limiting point.

Available at Alco wholesalers everywhere. Write for our Bulletin 152.

Designers and Manufacturers of Thermostatic Expansion Valves; Pressure Regulating Valves; Solenoid Valves; Float Valves; Float Switches.

ALCO VALVE CO.

857 KINGSLAND AVE. • ST. LOUIS 5, MO.

THERMOSTATIC EXPANSION VALVE **TXV**

TESTER

A Revolutionary NEW testing device by AIRSERCO—makers of the famous Thermostatic Control Tester.

Another AIRSERCO short-cut for the Service Engineer—a time-saver and money-maker that tests and sets the super-heat requirements for all types of thermostatic expansion valves.

- **INDICATES** by gauge readings the actual super-heat setting of the valve being tested.
- **EXAMINES** the true performance of the thermo valve by taking it in and out of its operating range.
- **ENABLES** the service engineer to quickly set any thermo valve for any refrigerant.
- **DETERMINES** holding adjustment and condition of the power element.

Also an ideal shop and service instrument for testing AUTOMATIC expansion valves and Thermo Controls

Available for Immediate Delivery
Write for Descriptive Literature

AIRSERCO

MANUFACTURING CO., INC.

435 MELWOOD ST. PITTSBURGH 13, PA.

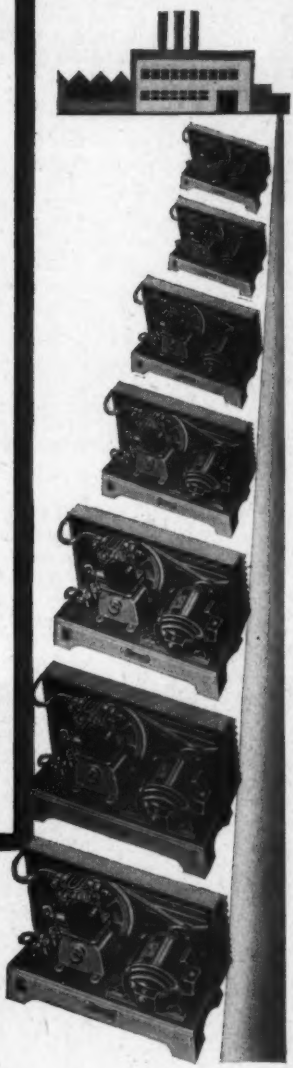
Short Cuts for the Service Engineer

THOUGHTS FOR SERVICE ENGINEERS

You've poured time, trouble *and money* into building a loyal trade of profitable customers. Don't let a single one slip away because he's down on your service. Nothing keeps your service business up to peak any more than dependable refrigeration. And, for many years, the "buy-word" for dependable refrigeration has been BRUNNER condensing units. When you stop to think that one good customer is worth more to you each year than the cost of a BRUNNER condensing unit, you can see the wisdom of recommending and installing the best.

BRUNNER MANUFACTURING CO.
Utica 1, New York, U. S. A.

REFRIGERATION
helps you serve better



AIR AND WATER COOLED MODELS
1/4 HP. TO 25 HP.

SOUTH BEND LATHES

FOR PRECISION WORK

Built for precision machining, South Bend Lathes are ideal for all fine work. Their dependability has been proved in every type of shop—from the smallest to the big toolrooms, laboratories, and production lines of large industries.

They give you the best of everything. Accuracy that is more than adequate for exacting service jobs. Versatility for efficient machining on all types of operations. And the ease of operation and rugged durability that have made South Bend Lathes first choice of service shops everywhere.

Write for illustrated catalog, stating size of lathe in which you are interested: 9", 10", 13", 14½" or 16" swing.

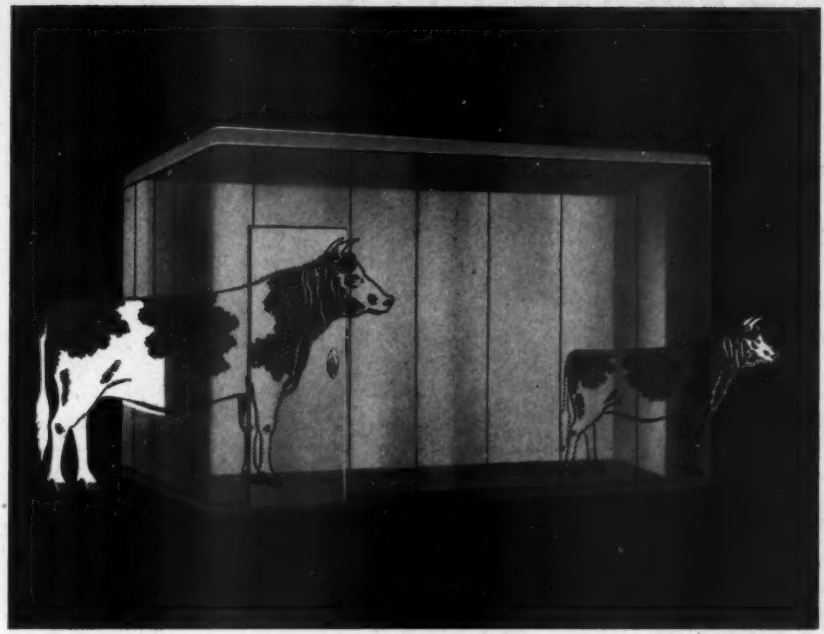
SOUTH BEND LATHE WORKS

Building Better Lathes Since 1906

529 E. MADISON STREET • SOUTH BEND 22, INDIANA

COLLET ATTACHMENT

One of more than 60 attachments and tools available for South Bend Lathes that provide greater versatility. Write for Illustrated Catalog 77.



WHEN IT'S BUSH REFRIGERATED

it doesn't go in as a cow

. . . come out as a calf

BUSH

OUR FORTIETH YEAR

One important feature of Bush-designed equipment is this . . . dehydration is kept to a minimum. To the packer, the freezer, the butcher, this means big weight savings and increased profits. Bush engineers made this possible by balancing airflow and coil temperature so as to maintain a higher relative humidity.

Your Bush factory representative knows how to help you select Bush equipment that will enable your customers to take full advantage of this design feature. Keep in touch with him.

Bush products are sold by leading refrigeration wholesalers everywhere

Heat Transfer Products • BUSH MANUFACTURING CO. • Hartford, Conn.

415 LEXINGTON AVE., NEW YORK - 549 W. WASHINGTON BOULEVARD, CHICAGO, ILL.
EXPORT ADDRESS: 13 EAST 40TH ST., NEW YORK, N. Y. - CABLE "ARLAB"

NOW . . . a cold-box type "Serviceman"

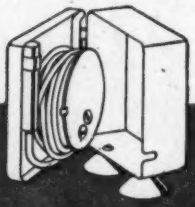
RANGE – 30° to + 65°!

Marsh does it again . . . first!

IT'S the celebrated Marsh "Serviceman" with range increased to match your ever-increasing work on quick freeze units. Yes, it now indicates from —30 to +65 degrees F. Along with this it has all the features of the original "Serviceman"—the same accuracy, same utility, same ability to tell you what's going on behind the closed door. Here is a "must" for your service kit.

JAS. P. MARSH CORPORATION, 2087 Southport Avenue, Chicago 14, Illinois

★ A heavy-duty precision movement, guaranteed accurate within one degree. Has Marsh "Recalibrator" to *keep* it accurate. Note hinged back containing bulb and 5 ft. of tubing slender enough to pass between refrigerator door and jamb. Suction cups prevent slipping and protect surfaces. The "Serviceman" is still available in ranges—10° F. to +100° F.



MARSH

Refrigeration Instruments

Safe protection all the way . . .

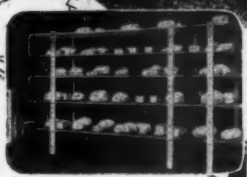
WITH

KOLD-HOLD

In every stage of food processing Kold-Hold offers superior refrigeration at lower cost. In the exclusive Kold-Hold Serpentine design, the refrigerant passages are an integral part of the plate itself which means that 100% of the exposed surface is prime cooling surface. Kold-Hold Plates produce required temperatures with less equipment . . . freeze quickly and defrost easily. One surface of the plates is flat, giving maximum contact and high heat absorption.

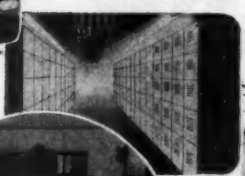
Kold-Hold Hold-Over Truck Plates hold truck bodies at desired temperatures thru a full day of operation. Then, at the end of a run, the plates can be plugged into the plant refrigeration system for recharging. Undelivered perishables remain safely in the cold truck overnight and are ready to go in the morning.

No matter where you stand in the food processing and distribution line, you will find that Kold-Hold offers you advantages that no other plate can give. Your nearby Kold-Hold Jobber is ready to serve you.



On the farm Kold-Hold cabinet Liners serve in milk coolers and farm freezer cabinets.

In the processing plant Kold-Hold Plate Stands assure faster, more thorough freezing.



In the storage plant Kold-Hold Plate Banks hold required temperatures with less equipment.

At home Kold-Hold Cabinet Liners in many popular makes of home freezers and storage cabinets.

In the retail store Kold-Hold Cabinet Liners keep frozen foods at proper temperatures.

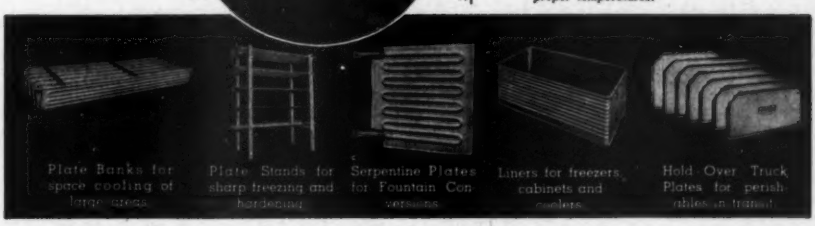


Plate Banks for space cooling of large areas.
Plate Stands for sharp freezing and hardening.
Serpentine Plates for Fountain Conversions.
Liners for freezers, cabinets and coolers.
Hold Over Truck Plates for perishables in transit.

KOLD-HOLD *Jobbers in Principal Cities*

PROCESSING TRANSPORTATION STORAGE

protects every step of the way

KOLD-HOLD MANUFACTURING CO., 502 E. Hazel St., Lansing 4, Michigan.

TESTED BY USE TESTED BY USE TESTED BY USE TESTED BY USE TESTED BY USE
BY USE TESTED BY USE TESTED BY USE TESTED BY USE TESTED BY USE
TESTED BY USE TESTED BY USE TESTED BY USE TESTED BY USE
USE TESTED BY USE TESTED BY USE TESTED BY USE
BY USE TESTED BY USE
BY USE BY USE
TESTED BY STED

...places Ranco Refrigeration Controls out in front

More refrigeration experts **know Ranco** Controls than any other—because more refrigeration engineers, jobbers and service men have bought and sold more **Rancos than any other control.**

Ranco Controls are precision built by men of skill and experience.

When you buy **Ranco** you get refrigeration controls that have been "tested-by-use" by the millions in commercial plants and households **everywhere.**

See YOUR Jobber Today

Send for Bulletin No. 1042 for technical information on Ranco Commercial 'O' Controls.

Ranco Inc.

COLUMBUS 1, OHIO

THE REFRIGERATION SERVICE ENGINEER

The National Magazine of Refrigeration Sales, Service and Installation

Published Monthly by

Nickerson & Collins Co.
433-435 North Waller Ave.
Chicago 44

Telephones Austin 1303-1304-1305

Publishers of Technical Books and Trade Journals Serving the Refrigeration Industries for over 30 years.

H. T. McDERMOTT, *President*
H. T. CURTIS, *Vice President*
L. R. TOWNSLEY, *Sec.-Treas.*

H. T. McDERMOTT
Editor and Publisher
H. D. BUSBY, *Managing Editor*
Associate Editors
EMERSON A. BRANDT
E. R. CURRY

L. R. TOWNSLEY, *General Mgr.*
HELEN G. SMITH, *Asst. Mgr.*
A. M. WILLCOX, *Eastern Mgr.*

Advertising
R. L. HENDRICKSON, *Manager*
EDW. DAVIESON

Official Organ
REFRIGERATION SERVICE ENGINEERS SOCIETY

EASTERN OFFICE
420 Lexington Ave., New York 17
Telephone Lexington 2-4735

Subscription Rates United States $2.00 per year. Single copies 25c All other countries $3.00 per year

Copyright, 1947
by Nickerson & Collins Co., Chicago, 44

Vol. 15 MARCH, 1947 No. 3

Contents

In This Issue....27

Managing and Operating The Service Business
—*by W. C. Irving*....29

Construction, Operation and Servicing Coldspot Home and Farm Freezers....37

Shipments of Refrigeration and Air Conditioning....39

Too Much Business
—*by Donald F. Daly*....40

Service Pointers:
Motor For an Emergency....47
Capillary Tube Application....47

The Problem of Discoloration of Meats in Display Cases
—*by J. H. Spence*....49

Construction Details of a Cold Storage Fur Vault....51

Questions and Answers:
Comments on Questions....56
Majestic Relay....58
Returning Oil....58
Failure After Defrosting....60
Storage of Microfilm....60

Book Review....62

Learning to Weld....62

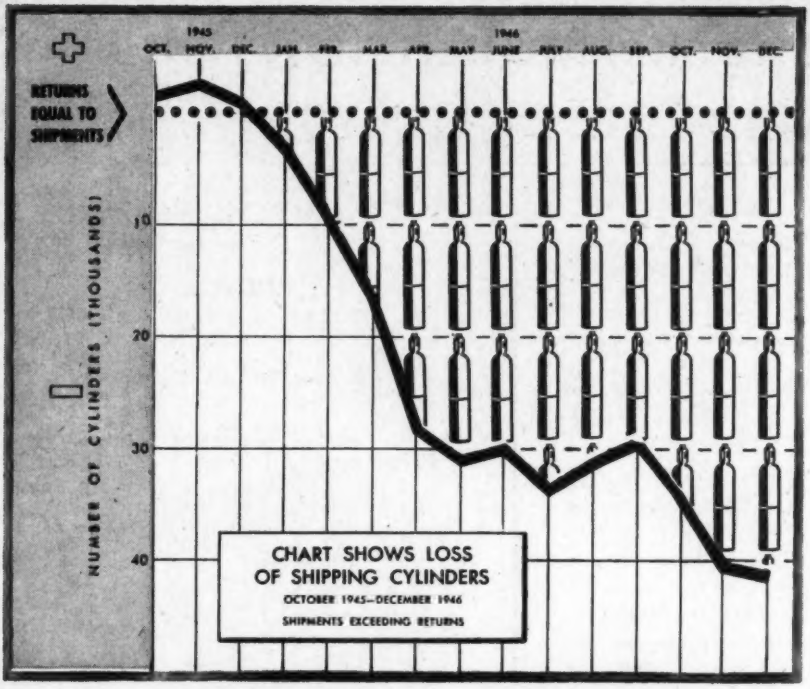
Plumbing and Pipe Fitting Contractors Form New Association....62

Wyoming Tax Bill Killed....62

R.S.E.S. News and Activities:
Coming Conventions....64
Three New Chapters in State of California....64
California Prepares for Record Meeting in April....66
Chapter Notes....68

New and Improved Equipment....80

News of the Equipment Industry....82



YOUR SUPPLY OF "FREON" REFRIGERANTS THREATENED BY CYLINDER SHORTAGE!

The chart above carries a warning. It proves non-return of empty cylinders seriously endangers delivery of "Freon" refrigerants.

Dotted horizontal line at the top of the graph indicates normal return of cylinders to the "Freon" plants. The downward line shows that throughout 1946 (with exception of June, August and September) far more cylinders were shipped than were returned. The accumulative loss now totals more than 40,000 cylinders!

These cylinders are urgently needed. To continue supplying "Freon" and to meet spring and summer demands, *every empty cylinder must be used.* Enough new cylinders aren't available. Returns *must* do the job.

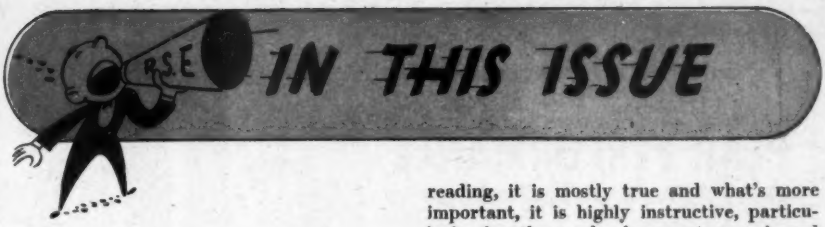
Today—please check *all* cylinders you have. Return the empties at once. Your cooperation will help ease the situation . . . aid in making it possible to ship "Freon" promptly. Kinetic Chemicals, Inc., Tenth and Market Sts., Wilmington 98, Delaware.

RETURN EMPTY "FREON" CYLINDERS NOW!

Ship empties via freight collect to:

Kinetic Chemicals, Inc.
Carney's Point
New Jersey

KINETIC
FREON
REG. U. S. PAT. OFF.
safe refrigerants



THE old days of managing a service business by keeping the books in your head and using a shirt pocket as a cash register are gone—probably forever. The service business has grown up; it is fast becoming big business and it is imperative that you know exactly what your costs are. The man who bids on the worthwhile jobs today has real competition in companies who make thorough analysis of each job and know every item of cost involved. They hold a tremendous advantage over the man who judges his profits by the amount of cash he has left in that shirt pocket at the end of a week. W. C. Irving, author of the article "Managing and Operating the Service Business" appearing on page 29, is a very successful operator in the state of California. He knows what he is talking about when he says, "He who knows (his costs) and knows he knows, is master."

THE last in the series of articles on "Construction, Operation and Servicing the Coldspot Home and Farm Freezer" appears on page 37.

THE "shipments of refrigeration and air conditioning" report issued by the Department of Commerce, Bureau of the Census, appearing on page 39, like the previous ones published and others to follow, should serve as another business planning guide for every branch of the refrigeration industry. To the service field it offers a further picture of the future potentials of service work.

IF YOU read the first paragraph of the article "Too Much Business" by Donald F. Daly, beginning on page 40, we are willing to bet you will not stop until you have read it all. It is a gripping story in the style of the fiction writers but even though it has a few embellishments added to make it good reading, it is mostly true and what's more important, it is highly instructive, particularly for those who have not experienced contracting work.

ONE of the Service Pointers, appearing on page 47 this issue, describes how, with the addition of a capacitor, to convert a split phase washing machine motor for use in refrigeration work. In these days of motor shortages this should be a very timely hint.

"THE problem of discoloration of meats in display cases" has always been an aggravating one and of course the discoloration can be due to several things. In his article appearing on page 49, J. H. Spence shows what effect light from various sources has on meats.

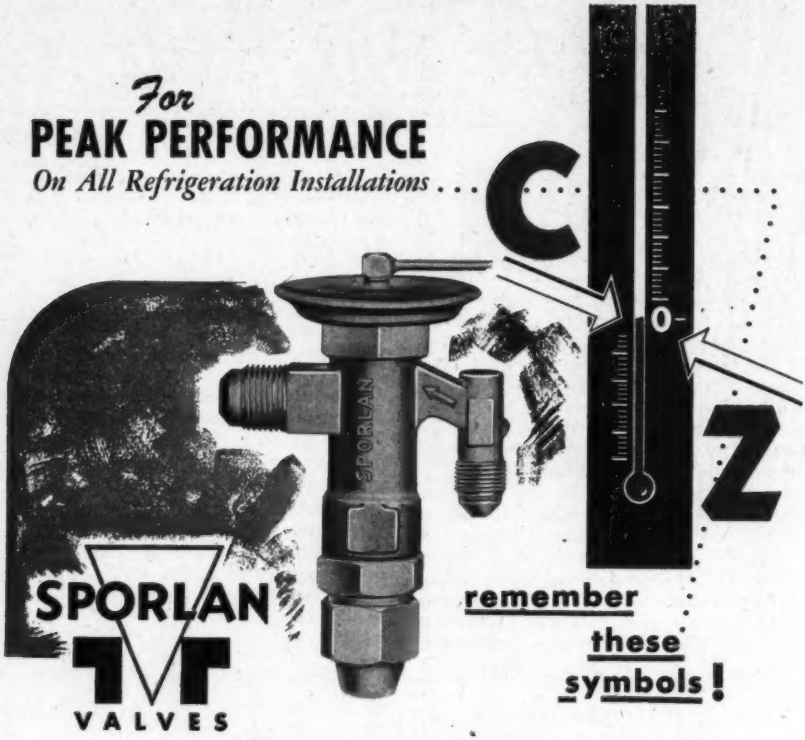
THE construction details of a cold storage fur vault as recommended by the Armstrong Cork Co., is shown on page 51. The article describes the shock method of killing larvae and stresses the importance of a vapor barrier in the construction.

"WHAT are the causes of failure after defrosting?" one of the questions in the Question and Answer section, page 56, is almost like asking how high is up—there are so many possible causes. The editor makes a stab at it though with some of the most likely causes.

COVER

THE modern way of merchandising frozen foods from self service display cases is portrayed on the front cover of this issue. The installation is in the frozen food department of Donahoe's Market, Pittsburgh, Pa., using Tyler equipment. Judging by the number of people intent on selecting their purchases, this is a very popular department with the patrons.

For
PEAK PERFORMANCE
On All Refrigeration Installations . . .



SPORLAN VALVES

remember these symbols!

SPORLAN "C" CHARGE FOR SUCTION TEMPERATURES Above ZERO
SPORLAN "Z" CHARGE FOR SUCTION TEMPERATURES Below ZERO

Your Sporlan wholesaler stocks the full line of Thermostatic Expansion Valves with Selective Charges to meet any operating conditions. Always consult with him before ordering and be assured of peak performance on all installations.

Sporlan Manufactures
SOLENOID VALVES
SOLENOID PILOT CONTROLS
MODULATING PILOT CONTROLS
REFRIGERANT DISTRIBUTORS
STRAINERS, CATCH-ALLS
and the only
THERMOSTATIC EXPANSION VALVES
with SELECTIVE CHARGES

Use a Sporlan Catch-All on every job...The most Perfect Filter-Dehydrater ever developed!

SPORLAN VALVE COMPANY
3723 COMMONWEALTH AVENUE
ST. LOUIS 17, MISSOURI

Managing a service business is a complicated job, but once you are familiar with it you find it easier. Knowing your costs is most important because "He who knows, and knows he knows, is master."

Managing and Operating The Service Business

By W. C. IRVING*

SINCE the late 20's my occupation has been operating a service business, first, as service manager for several large concerns, and the past fourteen years operating my own sales and service in Southern California. Although I have had a wide variety of experience along these lines, it is not my intent to appear to be an authority on this subject. If past experience is of any value, I trust you will gain something from this article.

Let us reminisce a bit, and go back to the late 20's. At that time there were few service men in the field. The manufacturers were reluctant to furnish any information regarding their products outside their own franchised dealers. The average dealer accepted service as a necessary evil. Most dealer organizations were nothing more than salesmen—without knowledge of the products they were selling.

The sales department would take all the profit from the refrigeration sold. The expense for keeping refrigeration sold and maintained was on the service department's side of the ledger—usually in red ink. In a good many dealerships, where the volume of sales was large, it became necessary to set aside 3 to 5 per cent, or even as high as 6 per cent, from gross sales to keep the service department out of the red.

Then came the independent service men. Many of the dealers "farmed out" their service to them. Many of them used the dealer's place of business as headquarters. After several years of hard work—seven days a week, not forgetting the nights, they really became independent service engineers, employing several men, independent of the dealers they had been servicing theretofore. They struck out for commercial franchises of their own. While the independent was making a place for himself in the world, the refrigeration industry was moving forward rapidly—many manufacturers of different component parts, as well as Jobbers, came to life.

During these years some dealers were looking upon the service end of the industry as a good paying business, and not as a necessary evil as before. Distribution of parts and equipment (thanks to our jobbers) had changed the operations of nearly all manufacturers. They opened their parts departments to all—holding service schools, distributing manuals, qualifying the service engineer for the maintenance of their products. THE REFRIGERATION SERVICE ENGINEER carried priceless educational data in each month's issue. The Refrigeration Service Engineers Society gained in membership; brought groups of competitors together, built a foundation under each refrigeration service engineer, and gave him confidence in himself and his fellowman. In fact, opportunity was knocking at our door.

What was the reason? Because refrigeration had become a necessity—as indispensable as food itself. In other words, the future anticipation of refrigeration was great. Soon after the arrival of the war, the majority of franchised dealers (having no products to sell) closed their doors. This opened the eyes of the manufacturers whose ultimate consumer contacts, until then, had been through their dealers. In a few short months this responsibility was

* Chairman of the International RSES Committee on Cost Records; Educational Chairman, California State Assc. Paper presented before the Annual Convention in Cleveland, Ohio.

upon the service man who, a few years back, had the fortitude to open a service business. By now these independents covered the entire service field on all makes, not just one manufacturer's products alone. Everyone looked toward him to service their products. He was faced with a reduction in number of service men, together with a shortage of parts and materials, and a lot of those fantastic government regulations.

Many of our manufacturers went "all out" for war production, leaving the service engineers to keep their equipment operating as best they could. Even though there were some equipment and parts available, one had to be on his toes to get his fair share. Owners of both domestic and commercial refrigeration equipment would have been in a tough spot had it not been for the service engineers. With new equipment no longer available and parts hard to get, I understand about 96% to 98% of existing equipment was kept in operation, the job which you engineers did to prevent breakdowns and "Keep 'Em Refrigerating," a slogan which we all remember, was an outstanding contribution to the welfare of the country. This is a record of which we can be proud.

The Serviceman Finds His Place

Today the service engineer occupies an equal place of responsibility in the industry with the manufacturer, jobber and dealer. I honestly believe a major portion of that credit is due to the educational assistance and cooperation he received from the Refrigeration Service Engineers' Society. While attending chapter meetings he helped others and learned more about his own business. He took an active part in the affairs of the chapter. Through this educational program a great many of our service engineers elevated themselves to the highest degree of practical engineering, and established a good refrigeration reputation throughout their communities.

A great percentage of our refrigeration engineers in the past have been practical men, with the know-how for actual installation and service work, but lacked the knowledge of profitable business operation, that is, keeping simple, but complete sets of books, including accounting and cost records, so they could actually know at the end of any given period whether they made a profit, and how much.

Many of you have, or are considering enlarging your service business. Many are entering the merchandising field, that is, with dealer franchises. You have a great opportunity—one that comes once in a "Blue Moon." You have been the only direct link, during the past five years, with the user and potential customer. You know who needs new equipment—about how long his present ones can last—what type he wants for replacement, and what his plans are for expansion. You have an idea how much he will spend for this new equipment, and if you take his old equipment in on trade, what will have to be done to rebuild it, and at what cost. There is that question again: "How to figure cost of operation to get net profit." Whether the service engineer operates his own business with one or more service men, or is the manager of a larger concern, employing many shop and service men, in either case, there is the problem of paying them at a profit to your organization. Being a practical service engineer is not enough. In order to cope with competition (of which you will have plenty) and make money as you should during the immediate years ahead, you will need to be a good business man as well. Look around you and see how many have failed in business since the War's end. There are several reasons for this. Some were good business men without a service organization to carry them over; some entered the appliance field, adding to their overhead (with very few appliances available); others were good service engineers, but lacked business knowledge.

In these days a man has to be a great deal more than just a good mechanic in order to build up and operate a lasting service organization.

Financing

He has to be able to finance the operation. The first step in this direction would be to contact and open an account in a friendly neighborhood bank. You will find the local banker friendly and ready to cooperate with you. Consult him when in doubt about money matters; ask his advice —money matters are his business; he knows them like you know refrigeration. Make a loan; pay it back a day or so before it is due. The banker's very existence depends on the loans he makes and gets back with interest. These days the banks have an over-abundance of money on hand. You must establish credit not only with the banker but with all supply houses and other business connections. Join your Chamber of Commerce. Build up a cash reserve in the

bank for an emergency or expansion. Be sure your feet are on the ground firmly before expanding.

A good rule to keep in mind operating any business: Having a well established credit is a good asset—paying cash after you have a well established credit is an asset to your business ability. From the assets in any business you derive a profit.

It is absolutely essential that there be records kept of any business, in fact it is mandatory. Uncle Sam, as well as your State and City says that you *must* pay income tax, you *must* collect and *pay* Old Age Benefit, Social Security, withholding and sales taxes. Our President, on June 30, 1946, signed an executive Order No. 9745, authorizing OPA to continue all the functions, powers and duties vested in it by the Emergency Price Control Act of 1942 as amended, and including Supplementary Order No. 167, which provides that you shall preserve all records to July 1, 1947.

To operate a service department successfully, the installation and service must be efficient and economical. To obtain these results, records are necessary even in small organizations. Only by examining past performance and comparing it with the present can we discover the mistakes to be remedied.

Proper accounting of service costs and income will not alone reduce the expenses, but will present the allocation of expense in true form. Cost of operation, or call it what you may, it is still Fixed overhead, including amortizing your trucks and shop equipment, and payment of rent, insurances, clerical salaries, office supplies, heating, lighting and power cost and all other expenses of those not having a cash return. Good accounting and cost records will give you full knowledge and full control of your business. Overhead has in the past been the stumbling block in 2 out of 3 business failures. In other words, *He who knows, and knows that he knows, is master.*

In order to explain my points, let's break it down in the following manner:

First—My Idea of a Serviceman's qualifications, and his compensation.

Second—Control of Inventory.

Third—Advertising.

Fourth—Mark-up and Labor Charge to Customer.

Fifth—Insurance, Capital Investments and Depreciation.

Sixth—Proper Records with their Forms and Uses.

Serviceman's Qualifications

There are several qualifications necessary to make a good serviceman. He should have at least two years or more of practical experience, which should account for his ability; he should be honest, neat in appearance, with a pleasing personality, and not the know-it-all type. Remember, he will be representing you to your customers, and it will be necessary that he sell himself to the customer before he can sell satisfactory service.

He is your best salesman, not only for service, but for new products sales. The service call ticket he has is an invitation into the customer's home or place of business.

There are several ways to compensate the serviceman for his labor. If you furnish transportation he could be paid by the hour, commission by some certain percentage or, the way I favor, one-half of their labor by invoice with a percentage on parts and commercial unit sales.

Shopmen, in nearly all cases, are paid by the hour.

Control of Inventory

Parts and materials have a way of getting away from you. It is important that you carry in your stock room a maximum amount of fast moving parts and a minimum of those slow moving parts to supply the needs of your shop and servicemen. The servicemen should be furnished with a definite inventory of parts and service material to take care of their average needs. Any additional parts needed should be requisitioned and added to the inventory. Retake the inventory every sixty days at least.

Upon completion of the service call, the serviceman can hand into the parts department the tissue copy of the invoice, and his truck inventory will be reimbursed to the extent of the parts shown on invoice. Remember, you can not sell those parts you do not have on hand.

Advertising

What is Advertising? It's any publicity intended to enhance the demand for a particular product or service. I will speak from the service end of the business, giving you my experience in advertising, leaving you to draw your own conclusions.

The classified business directory of the telephone book is a ready reference to meet

any emergency. The neatness of your trucks, painted and well signed, advertise while on the streets and highways. By placing your firm name on the front and rear, as well as on the sides, you are before the public at all times. Remember, these trucks cover your entire territory.

If conditions are such that your store and shop are in one building, divide with a partition, so that the shop cannot be seen from the street. The view from the street of any business, together with neatness of your transportation equipment, will classify you as to the kind of work you do. Word of mouth advertising from a satisfied customer will bring you more business than any other method. Taking into consideration that most of your service calls are emergencies, no one will hunt up an old newspaper to find your phone number. Direct mail advertising falls into the same category as the newspaper, or, shall we say, into the waste paper basket.

Now I know my friends in the newspaper business will not take kindly to the views I have just expressed. There may even be some of you who will agree with a friend of mine, who knows my sentiments, but who says, and I quote: "No great business or industry today has achieved its greatness or its predominance in a given field without the use of the printed page (newspapers, magazines, etc.). One of the most outstanding of these has been the refrigeration business. The widespread use (almost universal, one might say) of refrigerators has been due, not to word of mouth advertising, but to news and pictures and alluring and seductive advertising in newspapers and magazines. Ask the manufacturers and distributors if this is not so, and where they would be today as an industry if they had to depend upon "word of mouth" street-car cards, a sign on the truck or calendars. He would be away back in the ruck of the horse and buggy days. And where would the serviceman be if there were but a relatively few boxes to service and equipment to supply?

"There is no method or means more potent and productive as a business producer than the printed page, the newspaper, if you please, where the aggressive business man may consistently and continuously keep his name before thousands of readers who, when the emergency occurs, will have *that* name and *not* the name of a less aggressive and perhaps unreliable competitor flash to mind. The matter of referring to the telephone book then becomes a matter of mechanics and not hunt and pick at random someone whom you yourself would, perhaps, hesitate to recommend.

"No business, whether it be that of supply or service and depending upon the public for its existence, can hope to expand and progress without the aid and support of newspaper or magazine advertising."

Calendars, if proper thought is given to subject selections, will result in 90 to 95 per cent hangup. Novelties, such as cigarette lighters with your firm name and advertising imprinted on them, serve as an introduction and a remembered piece of advertising material.

Markup

Your markup on parts determines how much you are going to profit by their sale. To obtain and carry them in your stock has added a certain cost to you; besides, the sale of that part pays a portion of your overhead expense, after which you should have a net profit. The markup on parts should be determined by the location of your business, the source of your supplies, and the amount of stock you are compelled to carry. If you are any distance from the supply houses, it would be necessary to have a large inventory. I would say, in keeping your organization healthy, you should have a 100 per cent markup on cost or, as you wish, a 50 per cent gross profit on the sale price.

Labor Charge to Customer

Labor charges vary in the different localities. For example, let's use a service charge of $2.50 for the first 30 minutes on the job, allowing 15 minutes each to come and go from the shop; after the first 30 minutes on the job the time used will be charged at the rate of $2.50 per hour. There is a boundary in which these prices prevail. Beyond that boundary the rate of $2.50 per hour, plus 5 cents a mile each way, is put into effect. Shop labor is charged at the rate of $2.50 per hour, time and one-half after the 8-hour working day. Servicemen's labor is charged at the rate of $2.50 per hour on invoice, time and one-half after 7 p.m., and then only with the consent of the customer.

The average American is price-minded and knows something cheap is cheap, therefore it is a mistaken assumption on your part to cut prices. The cut-price artist never lasts in business; here today, gone tomorrow. Your competitor, like you, no matter how large or small his business, is trying

for the same goal—profit. If either one cuts prices he is bound to make less profit. Of course, should you feel that your service is worth less than that of your competitor, that is the time, before you go broke, to close up and get a job under someone else.

Insurance

Insurance—a necessary expense in any business. There are several different policies needed to protect your pocketbook while operating a Service business.

1. Workmen's Compensation Insurance, governed by the State law, premium determined by payroll audit. Workmen's approximate rate of $2.00 and clerical workers rate 10 cents per $100 earned.

2. Public Liability Insurance on your premises can be written in with your fleet insurance on your trucks and cars to any amount of insurance you wish. In these days the public will not sue you for $5,000 or $10,000; therefore may I suggest your Public Liability be made out for $20,000 and $30,000, and property damage $5,000. The rate will be around 13½c to 15c a hundred upon payroll audit; clerical workers' rate will be around 1c a hundred on their salary.

3. Customers' Goods Insurance. While customers' goods are in your shop for repair they should be protected in case of fire damage, which costs about $14 a thousand. I could go on in explanation but space will not permit, although I will list the balance of insurance policies you should have. If you own the building, you will need fire insurance on it; also fire insurance on parts and shop equipment. See that these policies do not have a 70 per cent clause in them—you want full coverage. If you are a dealer handling new products, there will have to be a flexible policy to cover them, and last, but not least, a good burglar alarm.

Capital Investment

Capital investment is the $2,000 or $3,000 you invested at the start of your business. In other words, the money you spent for the lathe, drill press, tools, work bench, office equipment, trucks and all other working equipment you needed for the store and shop, which in 3 to 5 years will become worn out or obsolete, and should have paid for themselves during this time.

For example, let us use the 3-year period for depreciation of value by writing it off at the rate of one-third each year and charging it as part of the operating cost for that year. In this manner your original capital investment is returned to you, and at the same time is written off the books.

In this way each year's depreciation having been added to the operating cost is thus deducted from your income tax.

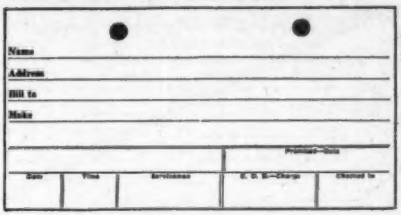


Fig. 1—The call ticket.

Proper Records

Let's start with the call ticket (Fig. 1). In the operation of a service and sales business there are certain forms to be filled out and kept as actual records for future, if not for the time being.

When a service call comes in, either over the phone or counter, it is necessary to write down all the information needed for the serviceman on a call ticket. These call tickets are to be in duplicate, original (white

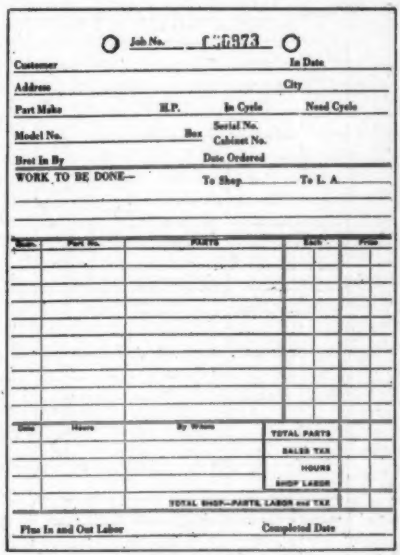


Fig. 2—The shop card.

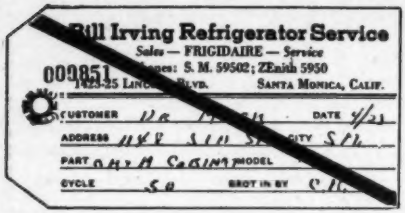
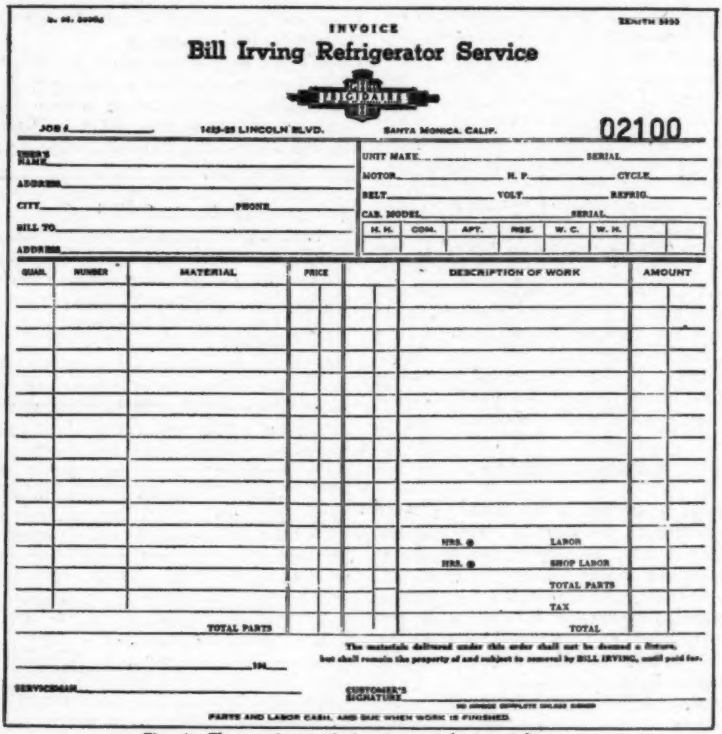


Fig. 3—Shop tag.

copy) goes to the serviceman, the off color copy being retained in the office so there will be a check on which serviceman has the call, and for ready reference upon any inquiries. When the job is completed it is stapled to the office copy of the invoice turned in by the serviceman.

Shop Job—Work Order

When a shop job or part comes into shop for repair or comes in to be sent out for repair, there is a shop card (Fig. 2) made. These shop cards are cardboard with a white fly sheet printed the same as the top of the shop card. Filling out the white flysheet with a carbon beneath it gives all the necessary data needed on the job for records. A yellow shop tag (Fig. 3), with the same information, is hung on the part to be repaired for identification. All three of these, the shop card, flysheet and shop tag carry the shop job number. The shop card stays in the shop, so time can be recorded on it by the time clock. If parts are needed, the shop card goes to the parts department to record the parts obtained (no shop card, no parts), the flysheet goes to office and is filed in the ready reference file stapled to the copy of the call ticket. The shop card, when repair in shop has been finished, goes to the office to be priced, after which it is hung on the serviceman's call hook, his name being on the shop card. When the repaired part is ready for delivery back to the customer, the serviceman


INVOICE

Bill Irving Refrigerator Service

FRIGIDAIRE

JOB #

1425-25 LINCOLN BLVD. SANTA MONICA, CALIF. 02100

USER'S NAME

ADDRESS

CITY PHONE

BILL TO

ADDRESS

UNIT MAKE SERIAL

MOTOR H. P. CYCLE

BELT VOLT REFRIG.

CAB. MODEL SERIAL

H. H. | COND. | APT. | RSE. | W. C. | W. H.

QUAN. | NUMBER | MATERIAL | PRICE | DESCRIPTION OF WORK | AMOUNT

HRS. @ LABOR

HRS. @ SHOP LABOR

TOTAL PARTS

TAX

TOTAL

TOTAL PARTS

The materials delivered under this order shall not be deemed a fixture, but shall remain the property of and subject to removal by BILL IRVING, until paid for.

19

SERVICEMAN

CUSTOMER'S SIGNATURE

PARTS AND LABOR CASH, AND DUE WHEN WORK IS FINISHED.

Fig. 4—The serviceman's invoice, made in triplicate.

makes the invoice from the shop card, plus his labor and other charges he may have on the job. The shop card, after being costed and costs tranferred to invoice upon completion by the serviceman, is then filed numerically in the shop card file for future reference by job number.

The Serviceman's Invoice Book

Next to your reputation in the community, the serviceman's ability and personality, the customer looks upon the type of invoice he receives in judging the class of the firm he is doing business with. The serviceman has with him on all jobs an invoice book of fifty invoices; these invoices (Fig. 4) are made up in triplicate, original being a white copy, second sheet a tissue, and third a yellow copy. All three have the same number. Data spaces are plainly marked. When filled in they will give you a graphic picture of the equipment being worked on. All parts and labor are plainly itemized on either C.O.D. or charge. No job is complete unless the date and both customer and serviceman's signature are on the invoice.

The originals of all invoices are checked in at the office each morning from the previous day's calls. As the service trucks carry a definite inventory, the tissue copies of each invoice now goes to the parts department to reimburse the serviceman to the extent of the parts shown on the tissue copies. Yellow copies are mailed to the customer, a paid receipt if it is paid for, an invoice if not paid. In either case the customer has received an itemized copy of the work done. In the ready reference alphabetical file you have a copy of the call ticket, and if the job came into the shop there is stapled to it the flysheet ticket from the shop card. Staple these two together with the invoice. I have found by past experience these two tickets not only hold the data I may need in the future but enable me to check up on all service calls.

Costing and Accounting

After the young lady in the office has all these little details taken care of, the shop cards and the invoices come to me for costing. Using a red pencil and the vacant column on the invoice I do a job I enjoy—find out the cost on each individual job. The shop cards are there, filed under the shop job number, while the invoices are ready for the bookkeeper to post. First to be posted in the Alphabetical accounts receivable book. Second to be posted in the Daily Ledger. Third to be posted in the Expense Journal.

The column heads you use in your daily ledger and expense journal, or, in other words, the breakdown you make in your receipts and expenditures, depend on what you want to know about your income and costs and what information you may be required to supply when making out tax reports.

The column heads, or breakdown, I use is shown in the following:

Accounts Receivable Book

Date	Shop Labor
Name	Tax
Invoice No.	Total
Parts	Serviceman
Outside Labor	Date Paid

These, of course, will be in column form, with the headings indicated at the top of each column. The sheets are usually kept in alphabetical order. Your accounts receivable book is indexed alphabetically and all accounts beginning with the letter "A" will be entered in that section, "B" under the section provided for it, etc. You may wish to use a separate sheet for one account, if it is an active one, or you may want to list several accounts beginning with the same initial on one sheet.

To explain this method, let us say that on March 3rd we had a job for a Charles Laughton. The first entry would be the date of March 3rd under the "Date" column. Then the name would follow in its proper space, after that the invoice number which we will call No. 2053. The next column on the sheet is "Parts" and here we will enter the amount we charged for the various parts that went into the job or a figure of $35.34. For the outside labor in this particular instance we charged $6.25 and for the shop labor $15.25. These figures will be entered accordingly in their proper place. Next comes the tax, which amounts to 88c. This gives us a total figure of $57.72, which we enter under the total column. This figure represents the amount we charged for the total job. Under the column "Serviceman" is written the name of the person who did the job. The last column is "Date Paid," where the date of payment is recorded.

This brings us to our second set of records or the Daily Ledger. The column heads for this book are arranged as follows:

Daily Ledger

Date and Name
Invoice No.
Cash
  Debit—Enter paid invoices and daily receipts
  Credit—Enter deposits made in bank
Accounts
  Debit—Unpaid invoices
  Credit—Accounts paid
Bank Deposits (Debit)
Sales Tax (Credit)
Parts Sold (Credit)
Finished Products (Credit)
Labor (Credit), Outside, Shop

Cost Side of Ledger

Parts
Outside Labor
Shop Labor
Commissions

We will follow through with the same job for Charles Laughton. The first entry on the ledger is the date, which is March 3rd. Then the name of Charles Laughton is written in its proper space. Next is the invoice number, which is No. 2053. This was not a cash transaction so we will enter it in the debit side of the column marked "Accounts." The figure is $57.72—as you will remember from the Accounts Receivable recording is what we charged for the total job. If it were a cash transaction it would be entered in the debit side of the column marked "Cash." Now under the four credit columns of Sales Tax, Parts Sold, Finished Products and Labor we will show a breakdown of the $57.72 total. The sales tax amounted to 88c, the price we charged for parts $35.34, so this is entered under "Parts Sold"; we charged $6.25 for outside labor and $15.25 for shop labor, so these figures are entered in their respective columns. There was nothing for "Finished Products" in this particular case. We now have entered all the components that go to make up the total of $57.72.

On the cost side of the ledger goes our *cost* figures in this case. The parts we sold for this job actually cost us $10.56. The outside labor cost us $3.13 and the shop labor $9.15. We paid $3.53 in commissions on this job. The above figures are entered in the columns provided for them. We now have, in one column, the complete story on the job of Charles Laughton. We said before, this was not a cash transaction and for this reason the figure of $57.72 was entered under "Accounts." Let us assume, now, that this account was paid in full under the date of March 30th. We would then make another entry on this sheet under the date of March 30th, but this time we would just enter the date and name and the amount of $57.75 under the debit side of the "Cash" column. Then by totaling all the items entered in this cash column we can readily arrive at a total intake for a given period. As cash is deposited in the bank, it is entered in the "Bank Deposits" debit column, and entered in the "Cash" credit column, thus crediting the cash account.

The third set of records is the Expense Journal. The following headings are used in column form. They are merely various items of expenses.

Expense Journal

Date
Name
Check Number
Check Amount
Petty Cash
  Debit
  Credit
Parts Purchased
Finished Products
Equipment Purchased
Tax on Equipment
Freight & Drayage
  Amount
  Tax
Drawing Account
Interest on Loans
Utilities
Telephone
Taxes, etc.
Insurance
Rent
Misc. (General)
Expenses
  Shop
  Office
Truck Expense
  Oil
  Gas
  Repairs
Salaries
  Total Wages
Employees' Tax
  Withholding Tax
  Employers' Tax
Equipment Depreciation
Parts Inventory
  (Jan. to Dec.)

The entering of these expense items is a simple matter. The first entry is the date, followed by the name of the concern to whom the check is made, the check number and the amount of the check. Then the amount is entered in the proper column. At the end of the month, or any other period, a total of each column will tell you how much was spent for parts, truck expense, salaries, or any of the other expense items listed.

Reading all this you have doubtless concluded that operating a business is a complicated affair. That it is, but once you become familiar with the procedure you will find it not so difficult, and will be very valuable to you in reporting your business as well as having full knowledge and control of it.

Construction, Operation and Servicing

Coldspot Home and Farm Freezers

Fourth Article, concluding the series.

Overcharge of Refrigerant

SIX cu. ft. model—An overcharge wastes refrigeration and may cause the following symptoms:

a. Frosting of suction line.

b. High and low side pressures higher than normal.

c. Shorter idle period.

If the unit is overcharged, it may be purged or recharged.

9, 12 and 18 cu. ft. models—These models are overcharged when the receiver has insufficient gas space above the liquid. As gas is pulled out of the evaporator and condensed, the liquid fills up the receiver, tubing, and lower part of the condenser. This results in:

a. High-side pressure higher than normal.

b. Motor stalling or tripping overload.

c. Condenser tubes relatively cold as they fill up with liquid.

d. Temperature indicator moving to warm position.

The level of liquid refrigerant in the receiver can be fairly well determined by playing a torch for a few seconds up and down the length of the receiver, and feeling the receiver with the hand. Below the liquid level, the receiver will not heat up appreciably, but above the liquid level, the receiver will heat up rapidly. The receiver should not be made hotter than the hand can bear. If overheated, the fusible plug may blow. Keep face out of range of fusible plug. If the unit is overcharged, it may be purged.

Purging—Overcharge and Air in the System

Air in the system may result from careless attachment of gauges and failure to pump down the system after repairs.

6 cu. ft. model—In purging a capillary tube system, it is very easy to let out too much refrigerant and then have to add more. Usually, time will be saved if the complete charge is pumped out and the system recharged.

9, 12 and 18 cu. ft. models—There is no problem in purging a conventional unit. Air may collect in the condenser or top of the receiver. As far as available, receivers will be used having a shut-off valve located horizontally on top. On the opposite side of the valve from the outlet connection is a fusible plug. Purge at either the fusible plug or at the inlet connection, whichever is more convenient. The compressor valve chamber can be purged through the discharge valve gauge port.

Frozen or Clogged Capillary Tube

Capillary tube systems are much more susceptible to freeze-ups than are expansion valve systems. Extreme care has been taken by the factories to dehydrate and prevent moisture from entering the refrigerating systems and to keep them clean. "Freon" will carry some moisture in suspension as well as react chemically with it. This moisture will condense and freeze out of the "Freon" at the point where the liquid leaves the capillary tube, and thus stop the flow of refrigerant until the system warms up enough to melt the ice. This may happen repeatedly unless the moisture is removed.

A frozen or clogged capillary will result in:

a. Cycling on the overload.

b. High-side pressure higher than normal.

c. Low-side pressure usually higher than normal.

d. Temperature indicator moving to warm position.

e. Frost loosens up on all walls equally.

If the capillary is frozen, it may be thawed out.

If the capillary is clogged, application of heat will have no effect, and the capillary will have to be blown out or replaced. In either case, the unit will have to be discharged and a new charge added.

To replace the capillary tube—The capillary tube and suction line are soldered together to form the heat exchanger and the

complete assembly will have to be replaced in the event of a leak in either line or clogged capillary that cannot be blown out.

Replacing Drier

The importance of keeping the refrigerating system dry cannot be overestimated. There is no way to tell whether a drier in a system is saturated. Therefore, when opening a system for repairs it is always best to replace the drier. A drier may be nearly saturated and hold moisture in cool ambients, and then when a hot day comes along it may release a slug of moisture and cause a freeze-up. Never use a questionable drier. If it has no caps on the ends, or if they are loose, it is probably worthless.

Replacing Unit—Hermetically Sealed

The hermetically sealed unit, as used on the 6 cu. ft. model, consists of a compressor assembly and a condenser assembly, no parts of which are replaceable in the field. In the event of failure, the complete condensing unit must be replaced. While very improbable, it is still possible for failure to result from:

a. Open circuits in the motor wiring.

b. Motor burn-out due to failure of overload device or wrong power supply.

c. Valve failure due to foreign material.

To replace the unit: a. Block up the rear of the cabinet about 4 inches to make the unit mounting bolts accessible.

b. Remove the flue, remove the top baffle by removing the 4 screws holding top baffle to side baffles, and push the side baffles down away from the unit.

c. Unplug compressor cord from junction block, attach a gauge, and discharge the unit to about 2 lbs. pressure.

d. Front-seat both suction and liquid shut-off valves.

e. Disconnect and plug suction line.

f. Disconnect liquid line from shut-off valve.

g. Remove drier holder from compressor and from drier.

h. Remove unit mounting bolts and lift out unit, taking care not to lose mounting bolt spacers or to damage baffles.

i. Attach drier holder and new drier, with inlet at top, to new unit, install liquid line, and attach to shut-off valve.

j. Install new unit.

k. Disconnect capillary inlet from old drier and connect to "Freon" drum.

l. Remove plug from suction line, invert

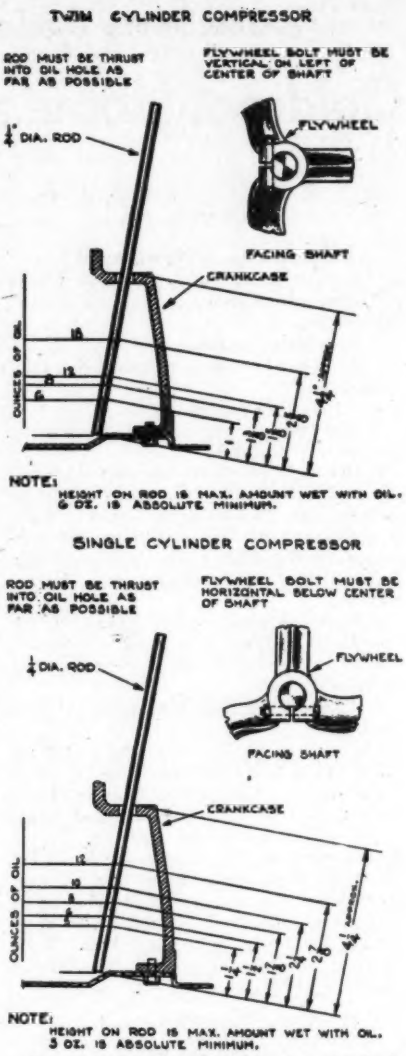


Fig. 13—Measuring the oil level on the single cylinder and twin cylinder compressors. Ounces of oil corresponding to inches on measuring rod are shown.

"Freon" drum to purge liquid through capillary and evaporator while connecting suction line to new unit.

m. Remove "Freon" drum, connect capil-

(Continued on page 76)

Shipments of Refrigeration, Air Conditioning Equipment

DURING the first and second quarters of 1946 sales of all major classes of components and accessories for air conditioning and commercial refrigeration equipment continued to increase as shown in Table I. The total dollar value of shipments rose 24 per cent from 40 million dollars in the period July through December, 1945 to almost 50 million dollars in the first half of 1946. This increase was due primarily to the sharp rise in the shipments of heat exchanger equipment which increased 49 per cent from a dollar value of 12 million dollars in the last 6 months of 1945 to 18 million dollars in the first half of 1946. The dollar

(Continued on page 76)

TABLE I. SHIPMENTS OF AIR CONDITIONING EQUIPMENT AND COMPONENTS AND ACCESSORIES FOR AIR CONDITIONING AND COMMERCIAL REFRIGERATION EQUIPMENT.

Product	Shipments of Complete Units					
	January-June 1946		July-December 1945		January-June 1945	
	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)
TOTAL	xxx	49,823,719	xxx	40,331,825	xxx	31,563,882
Condensing units	303,048	21,937,641	222,901	19,963,353	131,500	16,938,567
Ammonia refrigerants	832	815,022	820	951,871	965	1,550,786
Refrigerants except ammonia	302,216	21,122,619	222,081	19,011,482	130,535	15,387,781
Air cooled	286,030	16,149,433	206,851	12,888,128	120,180	10,490,167
Water cooled	16,186	4,973,186	15,230	6,123,354	10,355	4,897,614
Compressors and compressor units	78,446	6,801,246	55,464	5,880,390	51,876	3,697,969
Ammonia refrigerants	1,694	2,853,415	1,988	3,261,573	1,223	1,797,424
Refrigerants except ammonia	76,752	3,947,831	53,476	2,618,817	50,653	1,900,545
Centrifugal refrigeration machines	145	2,941,362	151	2,292,873	34	700,619
Heat exchanger equipment	xxx	18,143,470	xxx	12,195,209	xxx	10,226,727
Evaporative condensers	2,232	2,264,463	1,775	1,758,386	1,110	1,070,291
Unit coolers	87,889	8,026,206	51,647	6,085,612	39,356	4,100,945
Air conditioning	2,928	1,642,139	2,133	1,162,024	717	322,947
Refrigeration	84,961	6,384,067	49,514	4,923,588	38,639	3,777,998
Other heat exchanger equipment[1]	xxx	7,852,801	xxx	4,351,211	xxx	5,055,491

NOTE: The symbol "xxx" denotes not applicable.

[1]Includes condensers and liquid coolers of shell and tube and shell and coil types, as well as fin coils (heating and cooling) and plate type evaporators.

TABLE II. AIR CONDITIONING EQUIPMENT AND COMPONENTS AND ACCESSORIES FOR AIR CONDITIONING AND COMMERCIAL REFRIGERATION EQUIPMENT SUMMARY OF SHIPMENTS BY MAJOR CLASS OF PRODUCT, FIRST AND SECOND QUARTERS 1946

Product	First Quarter 1946 Shipments of Complete Units						Second Quarter 1946 Shipments of Complete Units					
	Total		Domestic[1]		Export[2]		Total		Domestic[1]		Export[2]	
	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)	Number	Value (dollars)
SECTION I—COMPONENTS AND ACCESSORIES												
TOTAL	xxx	22,514,479	xxx	21,529,271	xxx	985,208	xxx	27,309,240	xxx	25,746,332	xxx	1,562,908
Condensing units	136,594	9,584,757	131,410	9,110,120	5,184	474,637	166,454	12,352,884	158,643	11,583,185	7,811	769,699
Ammonia refrigerants	485	453,847	437	406,083	48	47,764	347	361,175	321	331,201	26	29,974
Refrigerants except ammonia	136,109	9,130,910	130,973	8,704,037	5,136	426,873	166,107	11,991,709	158,322	11,251,984	7,785	739,725
Air cooled	128,871	7,038,767	124,026	6,681,035	4,845	357,732	157,159	9,110,666	149,823	8,474,843	7,336	635,823
Water cooled	7,238	2,092,143	6,947	2,023,002	291	69,141	8,948	2,881,043	8,499	2,777,141	449	103,902
Compressors and compressor units	30,264	3,353,035	27 376	3,117,406	2,888	235,629	48,182	3,448,211	42,021	3,098,767	6,161	349,444
Ammonia refrigerants	979	1,651,096	847	1,499,501	132	151,595	715	1,202,319	602	1,017,701	113	184,618
Refrigerants except ammonia	29,285	1,701,939	26,529	1,617,905	2,756	84,034	47,467	2,245,892	41,419	2,081,066	6,048	164,826
Centrifugal refrigeration machines	67	1,358,758	65	1,338,818	2	29,940	78	1,582,604	71	1,467,040	7	115,564
Heat exchanger equipment	xxx	8,217,929	xxx	7,972,927	xxx	245,002	xxx	9,925,541	xxx	9,597,340	xxx	328,201
Evaporative condensers	1,022	1,033,279	960	986,921	62	46,358	1,210	1,231,184	1,091	1,105,351	119	125,833
Unit coolers	39,671	3,838,175	39,156	3,719,066	515	119,109	48,218	4,188,031	47,839	4,093,211	379	94,820
Air conditioning	1,402	830,355	1,365	814,536	37	15,819	1,526	811,784	1,488	796,223	38	15,561
Refrigeration	38,269	3,007,820	37,791	2,904,530	478	103,290	46,682	3,376,247	46,351	3,296,988	341	79,259
Other heat exchanger equipment[3]	xxx	3,346,475	xxx	3,266,940	xxx	79,535	xxx	4,506,328	xxx	4,398,778	xxx	107,548
SECTION II—SELF CONTAINED AIR CONDITIONING UNITS AND ABSORPTION SYSTEMS												
Self-contained air conditioning units												
Store type	3,812	2,616,900	3,675	2,537,815	137	79,175	3,657	2,576,376	3,581	2,540,386	76	35,990
Room type	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]	[4]
Miscellaneous air conditioning and refrigeration equipment, including absorption systems	xxx	387,805	xxx	374,746	xxx	13,149	xxx	916,151	xxx	911,264	xxx	4,887

NOTE: The symbol "—" denotes zero. The symbol "xxx" denotes not applicable.

[1]Continental United States.

[2]Includes Canada, Mexico, and United States territories.

[3]Includes condensers and liquid coolers, shell and tube and shell and coil types, as well as fin coils (heating and cooling) and plate type evaporators.

[4]Data on shipments of room type air conditioning units combined as follows for first and second quarters, to avoid disclosure of operations of individual companies: Total—2,189 units, $993,979; Domestic—2,075 units, $940,814; Export—113 units, $53,165.

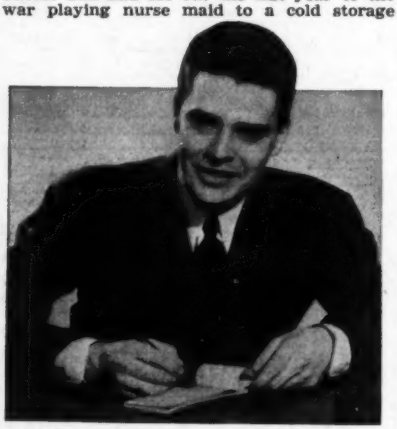
Too Much Business

By DONALD F. DALY

"HOW can we go broke?" Hal demanded, "We've got more business than we know what to do with." This was an unusual outburst for Hal. As a rule the big lug didn't worry about anything. "You're right, Hal," I agreed, "but the fact remains that we are going broke if something isn't done." I looked around at the puzzled faces of my three partners and felt like a heel. After all, I was responsible for our being in this predicament.

We had started out with such high hopes, and the way things stacked up we had every right to be optimistic about our chances. Every contingency had been forseen, and allowances had been made for every possible run of bad luck or poor judgment. That is, every contingency except too much business.

We had gotten together during the war. Charlie Kairns, Bill Giles, and Hal Newman had been members of a Navy construction battalion. I had been a civilian technician with the same outfit. We had worked together on several construction jobs in the Pacific and had sat out the last year of the war playing nurse maid to a cold storage



Hal Newman was a big strapping lad. He had been a refrigeration operator in a large packing plant in the Middle West.

plant we had built. It was on an island about two thousand miles from the war and none of us liked it, but we didn't have any choice in the matter. The commanding officer had asked that we be assigned to operate the plant and that was that. Of course, I could have quit, but a man learns to take things as they come.

A man never had finer fellows to work with than these three. All were younger than I am by a good many years. Hal Newman was twenty-three and had been a refrigeration operator in a large packing plant in the Middle West. He was a big strapping lad, with wide shoulders and narrow hips. He wasn't exactly handsome, but had that certain virile quality that women go for. And he went for the girls. Too bad to stick a husky boy like Hal off on an island with no women. We used to kid him about his talent with the ladies. He'd just grin and say, "Yeah, the Navy is sure raising Hell with feminine moral by keeping me out of circulation."

It's stimulating to be around a man like Hal. No complications, no worries. All he asked of life was a place to sleep, something to eat, and a little loving once in a while. He sure lost out on the love part for a couple of years, but he made up for it later and damned near wrecked himself, and all the rest of us too.

Bill Giles was the oldest of these three, about twenty-eight or so. He had a wife and three kids at home and had operated a refrigeration service shop before the war. He was an easy going fellow. Never got excited and could be depended on to do his best under any circumstances. I never could understand why he hadn't stayed home with his wife and kids and worked in a war plant. He couldn't explain it either. Just smiled and said, "A man has to do what he has to do."

Charlie Kairns was a pleasant fellow to be around. Reserved and quiet, and inclined to moods, but sociable enough if he liked the people. The lack of privacy in military life irked him I know, but he never complained. He had a thin sensitive face and deep set blue eyes, and was one of those slender, wiry men who never seem to tire. He was the type older women like to mother, and young women want to take apart to see what makes him tick. He didn't talk much about himself. He was an educated man and had been an engineer for one of the large manufacturers of refrigeration equipment. He must have been about twenty-six.

There wasn't much to do in the way of recreation so we spent our time, when we weren't talking about home and women, laying plans for the future. At first these plans were pretty vague, but as we became better acquainted we drifted into the idea of forming a partnership in a refrigeration sales and service business. It looked like an ideal setup. Four trained mechanics, each of us expert in some form of refrigeration work. The big drawback was that none of us had ever been in business for ourselves. I had operated service shops on a percentage basis, but that was petty larcency stuff.

We worked things out to the last detail. How much capital we would need; what line of equipment we would handle, and what part each one of us would play. Hal had the gift of gab so he was to be our salesman. Charlie

Here is a story, largely true but with a few embellishments, which provides in easy-to-read humorous manner an extremely interesting insight into the problems of refrigeration contracting as it exists today. To the uninitiated in the contracting game it will give an insight into the business end of contracting for the larger installations, the financing needed and some of the risks involved.

Bill Giles had operated a refrigeration service shop before the war. He had a wife and three kids—was easy going and never got excited.

had been an engineer and the only white collar man among us, so he was to run the office. Bill was to be service manager, and I was to take care of the installation work. Well, it didn't hurt to dream. But almost before any of us could realize it, our dreams were on the verge of coming true.

The war ended suddenly and as a civilian employee my services were no longer essential. I went home. The other boys had piled up enough points in the early part of the war when we were building those advance bases to be eligible for discharge. We agreed to keep in touch with each other and to meet in San Francisco when we were all free.

It was about four months before we could get together, but this time was not wasted. Charlie had written to his former employers and they had agreed to give us an agency for their full line of refrigeration equipment. Hal had applied for, and somehow managed to purchase, two pick-up trucks on his veteran's priority. How he did it I don't know, but with his gift for talk anything could happen. Bill still had his shop equipment, so we had just about everything we needed to get started.

We didn't have enough money to swing an agency in one of the larger cities, but were given a live town about fifty miles out of San Francisco. It was a town of about twenty-five thousand population, and was surrounded with rich farming lands, stock ranches, and had some light manufacturing. It looked like an ideal spot. We agreed to put up three thousand dollars apiece to start. All of us could manage this amount and still have a little in reserve.

We were able to get a five year lease on a building for our shop by doing our own alterations. These alterations didn't amount to much. A couple of partitions for the office and show rooms, work benches, and some additional lighting fixtures. The rent was pretty steep, two hundred dollars a month, but we didn't worry too much about that. It was a good location with plenty of room for show room, shop, and storage, and adequate parking space.

Our financial set-up was based on a six months period. That is, we figured there

Charlie Kairns, quiet, reserved, thin but wiry and a former engineer, was to manage the office.

would be at least six months while we were getting started when there would be very little, if any, income from the business. Since we had to eat in the meantime we were each to have a $35.00 per week drawing account. $3,640.00 was set aside to cover this. $1,200 was earmarked for the first six months rent, and it took $600 to close the lease. $5,000 was put in a fund for the purpose of buying equipment and to handle any large jobs we might get. This left $1,500, to handle incidental expenses and to lay in a stock of small parts.

We didn't get much new equipment to sell the first year, but we did get a lot of service and repair work. There hadn't been any

service work, except emergency jobs, done in that town for several years and most of the refrigeration equipment was in bad shape. We were figuring for the long pull so we didn't hold anybody up on prices. The motto of our company—we called the outfit "The Pacific Refrigeration Sales and Service Company," was "Satisfactory service at a reasonable price." Merchants and other equipment owners were glad to see us come in to that territory. In the past much of their work had been done by large organizations from San Francisco. It cost them extra for traveling expenses, and for the past few years they hadn't been able to send men out whenever they were needed. It worked out swell for us.

We got more service work than we could handle and by the end of six months we were able to increase our drawing accounts to fifty dollars a week each. By the end of the first year we had doubled our working capital and the work was still rolling in. Most of our income was from labor and sometimes we worked sixteen hours a day, seven days a week. But we loved it. It was great to be our own boss. Even though this meant working twice as hard as we would have if we had been working for wages.

Hal Hears of a Big Job

There still wasn't much new equipment available at the end of the first year, but I had gotten a line on some surplus stuff the Maritime Commission and the War Shipping Administration were going to turn loose. We started looking around for some new construction. One day Hal came tearing into the shop. "Hey Slim," he shouted. Meaning me. "The Great Western Grocery Company is going to build three new stores and a storage warehouse in this town. Do you think we could get the refrigeration work?" "I don't know, Hal," I replied. "But we probably can. We have most of the service work around here tied up now. I see no reason why we can't get that account too." "Service work Hell!" sputtered Hal. "I don't mean the service work. I mean the whole damned refrigeration installation on the new buildings. Boy, that job will run to a hundred thousand dollars. That's what we want. This service business is all right, but if we are ever going to make anything out of this deal we've got to go after the big stuff."

Charlie and Bill came in just then and we went into a huddle. Hal had all the information that was available. He'd gotten his information from a waitress who worked at the hotel. Leave it to Hal to be on good terms with all the waitresses, and all the other women in town too. Here was the deal, as he had gotten it from Aggie the waitress. The Great Western Grocery Company were going to launch a construction program in Northern California. It was part of their post war expansion plans. This town was to be a distribution area and they were going to build three stores here and a large warehouse for the storage of meats and other goods. They were opening up a construction office in town, and this guy Aggie had been out with was the company's representative. The buildings were to be built by a general contractor, but this guy was looking out for the Grocery Company's interests.

The boys were all for going after the business at once. I pointed out that we didn't have enough capital to swing a hundred thousand dollar job, but they wouldn't listen. Even easy going Bill was excited. "Gosh Slim," he said. "This is what we started in business for. You know darn well that in a couple more years there will be a dozen service shops in this town and we will be bucking a lot of cut-throat competition. If we don't go after the big stuff now while the field is wide open, we never will get anywhere." Hal and Charlie seconded this. "After all," said Charlie. "We don't want to spend our whole life fixing refrigerators. Bill is right. I say shoot the works now and if we don't make it—the Hell with it—we go broke." I was pretty excited myself. If we could swing this deal we would be set, and maybe we could get all of this company's work. They were new out here and were not tied up with an organization to do such work. It was sure worth a try.

I introduced myself to Harry Tomas and after a few generalities, I laid my cards on the table.

We were all pretty much of the same mind —take one big shot—and if we went broke, we went broke. However, I pointed out again that we didn't have enough working capital to handle this big a job; we didn't know if we could get the material, and, since we had payed cash for everything we had bought up to date, we hadn't established our credit. Hal slapped me on the back. "Ah Hell, Slim, you're getting soft," he said, "When we were out there you were always the one to push us guys along and take chances. Come on, Slim. What have we got to lose." I gave in.

New construction was my department so the next day I called on the Great Western Company's representative. We got a break here. I didn't know the man, but I knew his type from way back. He was an old construction stiff and we spoke the same language. Harry Tomas was his name. A shrewd looking man of about forty-six; short and stocky built; with a ruddy, lined, face, and all the earmarks of a good drinking man. I introduced myself and after a few generalities I laid my cards on the table. He came right to the point. He had been in the building game ever since he was old enough to work

and knew his business. If he had hemmed and hawed I would have known that he was, either a four-flusher or looking for a cut. He wasn't any of these. I'd pegged him right at the start. He was an old time construction man who had a good job, and was out to protect that job by making the best possible deal for the Great Western Company.

Harry Tomas gave me an outline of how things stood at that time. "It is common knowledge," he said, "that my company is entering the grocery business in this area in a big way. A statement to that effect will be released to the press in a few days. However, due to the shortage of building materials it may be some time before we can complete these buildings. The building sites have all been purchased, and the general contracts for the buildings have been let, but the refrigeration work is to be let on a separate contract. It's wide open.

"If you can show me that you can supply the material and do the work on a competitive basis, you have as good a chance as anyone to get the job. We prefer to have the work done locally if possible. But I don't believe you can supply the material and equipment. My company's Eastern office has been making some inquiries, and the gist of the report they turned in is that refrigeration equipment of the kind needed on this job, is almost non-existent." "The lack of this equipment," he went on, "is the one big factor that is holding up our construction program."

We Received the Plans

Tomas gave me a copy of plans and specifications and told me to look them over. If we thought we could supply the material and equipment, to submit a bid. He wanted it clearly understood that he would not go for a cost-plus bid, or for time and material. The bid would have to be on a straight contract basis, and the bid would have to cover all three stores and the warehouse.

I went back to our shop and the boys were all there waiting for me. We went into conference. The plans and specifications sort of took the wind out of their sails. They had never had any experience with this part of business. When they got a look at the amount of material and fixtures required they were ready to fold. "Gosh, Slim," Hal muttered. "I didn't have any idea it would be this complicated. Do you think we can handle it?" "I don't know, Hal, we can try," I told him. "First we will have to break the plans down and find out just what is needed. Then see if we can get the material. We have one break, we'll be doing our own installation work, so we won't have any payroll to worry about."

The three stores were a conventional chain grocery store set-up: butchers walk-in boxes, meat counters; delicatessen counters; milk and dairy reach-ins; bottle coolers, frosted food boxes; ice cream cabinets, and etc. The warehouse called for three large refrigerated rooms. One for butter and eggs; one for vegetables and fruit, and one for meat. This part would be easy. It called for heavy equipment and pipe coils. We could get them from the Maritime commission, or from one of the dealers who had bought up such surplus material. These larger units were not in much demand except on ships, or other large installations. The real problem would be the refrigerated show cases and the small units. It has been customary in the past few years to install a small refrigeration unit for each box, rather than to put all of the boxes on one large unit. This is done because it is easier to get repairs on these small units. If trouble develops they just exchange units. The same as they do on household boxes. "Maybe we can get around that though," I told the boys. "It has always been my contention that this is a wasteful procedure. The best type of installation is a central plant. The same system that is used in large packing plants and cold storage warehouses. You don't put a heating boiler on every floor of a building. Why should it be necessary to put a separate refrigeration unit on each box?"

Charlie was nominated to break down the plans and specifications and list each piece of material and equipment separately so we would know what we were up against. I took on the job of estimating the labor cost and the amount of copper tubing, pipe, valves and fittings, and etc. that would be needed to do the jobs. I also had to prepare plans and specifications for the three large refrigerated rooms in the warehouse, and the walk-in boxes for the three stores. Contracts for building these boxes would have to be sublet as we didn't have facilities for such work.

It took several days for Charlie and me to compile lists of the material, and to check each other's figures. When we had completed our estimates we called another conference. It didn't look so good and the boys were ready to give up. Here's where I suckered myself. I didn't want to quit. I was still a little sore about that crack Hal had made about my being soft. "Who's soft now, you gift to womanhood you?" I asked. "I'm sorry, Slim," Hal said. "I didn't mean it."

List of Materials Was Staggering

We looked over the list of material and equipment required for the three stores and the warehouse. It was an imposing one. "Hell," said Bill. "There isn't that much refrigeration equipment in the whole United States." We dolefully agreed with him. The fact was, we just didn't know how to start. Material procurement had become a highly specialized field, and none of us had ever had any experience at that sort of thing. We sat there for quite a while saying nothing. Finally Bill broke the silence. "You know fellows, people are building stores, and they are getting equipment to put in them. If they can do it, why can't we? If we give up now we're sunk."

We all agreed that he was right, but how would we go about getting the stuff. "Well," Charlie said. "You don't build a building all in one piece. You start from the foundation and work up. Why don't we make a list of the material we can get from the supply houses we have been buying from. Then we will know just how short we fall of being able to do the job. I ran into a fellow in San Francisco the other day who is manufacturing a line of show cases. They're good

ones too. I went out to his shop and looked them over. Maybe he could make the cases to order. They would just about have to be made to order anyway. Why not look into it. It would be a start."

The ideas came thick and fast after that. Bill had done some work at the Navy Base recently. The commissary there had been run by a civilian company. They were closing down. Maybe we could get some of that equipment. Hal remembered that he had seen a lot of, what looked like new refrigeration units, in a town near San Francisco when he had gone down there to keep a date with a little number who worked for an outfit who bought and sold surplus government equipment. In fact come to think of it, when the girl introduced him to her boss, the guy had asked him if he could use any refrigeration equipment. But it had all been large units and he didn't think we would have any use for it. Anyway he'd had other things on his mind that day. That guy.

We began to perk up a little. Bill said he thought he knew where he could find some valves and fittings and some copper tubing. We decided that we would spend all our spare time for the next couple of weeks in trying to find material. Each of us was to follow his own leads. We weren't to tie ourselves up in any way. Just nose around and see what we could find out.

At our next conference things looked a lot brighter. Charlie had found that we could get the show cases and fixtures built to order. Bill had gotten a line on a lot of fittings and copper tubing. I had taken the plans and specifications to several insulation companies and got a price for building the walk-in boxes. Hal had inspected the equipment at the surplus property dealer, and had found that we could get all the large units we would need. But there were no small units to be had anywhere. However, I wasn't worried too much about this. I had always been in favor of one central plant for such installations and was sure I could sell Tomas on the idea. It looked as though we might be able to put the deal over after all.

Tomas Invites Our Bid

I called on Tomas the next day and told him how things stood. He was very much interested in the possibility that we could get the material. He said, "The Great Western has a lot of money tied up in these buildings and they are coming along fast. We want to get into operation as soon as possible. If you can do the work, and supply the material, at a half way reasonable price we are interested. But I am not sold on the idea of changing over to a central plant. We are not in favor of 'putting all our eggs in one basket' on this refrigeration stuff."

"Look here, Mr. Tomas." I told him. "You won't be putting all your eggs in one basket. We'll install two units for each plant. Each one of them will be large enough to carry the entire load. If one unit breaks down you can just change over to the other unit. It will also save you money when the plants have to be overhauled. There will be no interruption in service during these periods. It is a cheaper and better installation for the long pull. The original cost is somewhat higher, but you will save money in the long run. I know of any number of such installations around here that had been giving good service for many years. If you will come with me I'll take you where you can inspect some of these plants." He wouldn't agree to this, but said he would make his own investigation.

I guess he made a thorough investigation for we didn't hear from him for nearly a month. One day he came into our office and told us he would go for the changes if the price was right. "You fellows can submit your bid," he said, "and I will let you know as soon as possible. But you will have to prove to me that you can handle the deal. You will have to enclose a certified check for ten percent of the total price when you submit your bid. And you will have to show me that you can supply the equipment and complete the installation in a certain specified time. The bid must cover the entire job, and the contract will cover the entire job as a single unit. In other words you won't have completed the work until every piece of equipment has been installed in all three stores and the warehouse. And has been tested to my satisfaction."

What We Were Up Against

Now we really went to work. I explained to the boys just what we were up against. "It's up to you fellows," I told them. In order to prove to Tomas that we can supply the material we will have to take options and possibly, put up a deposit to hold the stuff. This means laying out cash that we can never recover if the deal falls through." Their answer was unanimous. "Shoot the works." As Hal put it. "What the Hell. We might as well drown here as further up the river."

On the show cases that were to be built to order, and some of the material and equipment, all we had to do was get bids and letters assuring us that they could deliver the stuff at a certain date. It took two weeks to line up all the things we needed to submit our bid. In most cases we didn't have to put up any money. The dealers were willing to give us the letters we needed to prove to Tomas that they could deliver the goods. Hal turned on the charm and got an option from the man who had the surplus equipment. I don't suppose the girl in the office had anything to do with it. It turned out she was the guy's niece.

Tomas took the bid with the understanding that he would give us his decision within ten days. The bid amounted to $66,000. Boy, that's a lot of money for four guys like us. I almost prayed that we wouldn't get the job. In fact, I added six thousand dollars at the last minute without saying anything to the other fellows. We hadn't figured too close, but this extra margin might come in handy if we run into something unexpected. I also had a hunch that Tomas was more anxious than we were to get the refrigeration work done. After putting up the $6,600 deposit with the bid we had just $10,000 left in the kitty. We could hock our trucks and equipment for about $5,000 and between us we could probably dig up another $6,000 in cash. If we figured a gross profit, not counting our labor and overhead, and what material we

had on hand, we would need $43,000 to complete the job. With the $21,000 we had, or could raise, we were still $22,000 short.

However, we figured that by stretching our money as far as we could, we could get a big percentage of the equipment on the job, then go to the bank and borrow enough to complete our contract. We were probably right about that, but we didn't know much about such things. If we had gone to the bank in the first place we would have saved ourselves a lot of grief. Maybe it is just as well that we did sweat it out by ourselves.

The buildings were far enough along so we could have the insulation contractor start building the walk-in boxes at once. And since the refrigeration plants were in the basement we could go ahead with them. For the next two months we didn't have time to eat or sleep. We were on the job night and day. Everything went fine. We spread our money out as thin as possible and were getting by. Most of the firms we dealt with seemed glad to cooperate with us. The man who was building the showcases was working on a shoestring the same as we were, so he had to have his money. As soon as he completed a show case we would pay for it and move it into our storeroom. They would be the last thing to go in, but we wanted to have them on hand.

At last we completed the machinery installations and were ready to install the show cases. The plant in the warehouse had been tested and passed so we didn't have to worry about it. The general contractor had the buildings all done but the inside finish and the flooring. We were breathing a little easier now. We went to see Tomas to find out when we would be able to set the fixtures and complete the job. Our money was just about gone and we were anxious to get a completion so we could collect. We didn't have any warning of the blow that was in store for us. Tomas greeted us cordially. "You boys did a lot better than I thought you would. In fact, I didn't believe you could do the job at all. Congratulations."

"That's fine, Mr. Tomas," we told him. "We're glad you are satisfied. But what we want to know is, when do we collect." "Well, boys," he said slowly. "You know this building program has come along a lot faster than we thought it would. As the situation stands now the buildings are way ahead of the rest of the organization. A lot of other factors enter into an enterprise like this one. The fact is, the company just isn't ready to open the stores." "What does this mean to us," I asked? "Will we be able to complete the job and get our money?" His answer was even slower in coming this time. "No, I am afraid not. We could complete it if it wasn't for one thing—hardwood for the floors."

"Hardwood for the floors, I thought the floors were to be inlaid linoleum!" "That's right, they are," he replied, "but the linoleum has to be layed on hardwood flooring. This green and unseasoned lumber we are getting these days shrinks a lot and causes the linoleum to buckle and crack. That means we would have to replace it after a couple of years. If we were ready to open the stores we would probably go ahead and lay the linoleum on softwood floors, but since we aren't ready to open up anyway, the company wants to wait until we get the hardwood." "How long will that be? I asked. "Oh, not long," he replied, maybe two or three months." Two or three months. It might just as well be two or three years. "Can't we collect part of the money now?" I asked. How about paying us off for the warehouse. It's complete and has passed your inspection." "No dice boys," said Tomas. "Read your contract. You know its terms."

We were a pretty sick bunch when we left his office, and we didn't have to read the contract. We knew it by heart. Briefly, it read as follows: We were to be paid fifty percent of the contract price when the job was completed and tested to the satisfaction of Tomas. Forty percent was to be paid thirty days after the initial payment, and the final ten percent at the end of one year. We had objected to this at the time we signed the contract, but Tomas had been adamant. He had said, "I know it is a tough contract for you fellows, but I have to protect my company." We'd signed anyway. In our eagerness to get the job we had been thinking only of ways we might fall down on the job, and hadn't given any thought to the possibility that some factor beyond our control might be responsible for our failure.

"I'm sorry, fellows," he said. "I guess it's my fault, but I couldn't help it. Myrtle and I had a falling out."

Now we were in a spot. We didn't have enough money in the kitty to buy our meals, let alone pay off our creditors. We went around and explained things to our creditors, and got a thirty day extension from all of them but the surplus property dealer. We had bought nearly all of our refrigeration units from him and his bill accounted for more than half of our indebtedness. We couldn't understand why he had changed so. He had been all for us the last time we had talked to him. Hal had been responsible for our meeting him in the first place so we asked him about what the trouble was. He

had the answer all right. "I'm sorry fellows," he said, I guess it's my fault, but I couldn't help it. Myrtle and I had a falling out. "A falling out! I gasped. "You big lug! This is a Hell of a time to have a falling out with the niece of our biggest creditor. Get on over there and turn on the old sex appeal before we murder you."

"I dont' think it will do any good," Hal said earnestly. "We really had a beef. Myrtle's got matrimony on her mind." "Is that all?" we asked. "Well for Pete's sake go on over and marry her. "Oh. I couldn't do that," Hal stammered. "You know I don't want to get married." "Do you have to marry her?" Bill shouted. "Can't you stall her along until we get our dough. Promise her anything. You can get out of it later. Wait until this blows over then tell her you picked up leprosy or something while you were in the Pacific." "Why don't you tell her the truth?" Charlie snorted. "That you're a male counterpart of a nymphomaniac." "Ah, I'm nothing like that," Hal disclaimed modestly. "I've just got a lot of energy. Besides, you don't know Myrtle. That wouldn't scare her off. That girl's got energy too."

We finally, by alternately begging and threatening, prevailed on Hal to go over and make it up with Myrtle. "All right," he said. "But I don't know how this is going to work out. You know I've been going around with the daughter of the man who had the insulation contracts. We owe him money too. "Get out of here you mass of muscle and sex appeal." I screamed. "We don't care how you ration yourself out. But for the love of Heaven keep these women satisfied for a few weeks if it kills you." Well, Hal managed somehow to keep his girl friends happy for a while, but that solved only one of our problems.

Sweating It Out

Ten days passed and nothing was done about completing the stores. I went to see Tomas to find out if there wasn't some way we could get, at least part, of our money. He wasn't very happy either. "There's just one way you can get your money," he snapped. "Complete the job." "How in Hell can we complete the job?" I snapped back. "We're not holding things up. It's the hardwood for the floors. We're not in the flooring business." "Well," he grinned sarcastically, "all you have to do to get the job finished is to go out and dig up a few thousand board feet of hardwood flooring. You dug up a lot of stuff that no one else could find. Maybe you can find the hardwood flooring, too." "What kind of hardwood?" I asked. "Any kind," he replied. "Just so it is well seasoned and in good condition." "Have you tried every possible source of supply in this area?" I asked. "I've tried every source in the United States," he snarled. "What the Hell do you take me for? Do you think I am deliberately trying to cross you guys up." No. I didn't think that. He was a square-shooter all right.

We held a council of war and decided to run down every source of hardwood we could find out about. We even ran ads in the San Francisco papers, but no luck. We did dig up a few job lots of the stuff, but there wasn't enough to do any good. Things looked pretty black. "Listen fellows," I said. "We're all mixed up. We've been so busy since we started this shop we haven't had time to think of ourselves. When things got unbearable out on that Island we went fishing. Tomorrow is Sunday. What do you say we go fishing? Maybe it will do us good to get away for a day."

We couldn't work up much enthusiasm even though it was a nice day. We were out near Point Richmond, but on the Bay side. The fishing wasn't so good here, but it was sheltered from the wind. We were fishing off of a big rock that jutted out into the Bay and we had a good clear view. There were several old sailing vessels aground on the mud flats a few hundred feet off-shore. We had been watching them idly for some time when Hal spoke up. "You know those old winjammers are really something. I was on one of them one time. It was a kind of a museum. They had a lot of fish and old guns and stuff. But I wasn't much interested in that. It was the ship that took my eye. She was built over a hundred years ago and is still as sound as a dollar. Every stick of timber in her hull was hardwood."

A Source of Supply

HARDWOOD! I jumped up so fast I almost fell off the rock. HARDWOOD! HARDWOOD! HARDWOOD! I stood there for a moment repeating the word over and over. First Charlie got what I meant, then Bill, and finally Hal. It's a wonder we didn't break our necks getting down off that rock. There was a man in a small boat fishing just a little way off shore. We hailed him and hired him to take us out to one of the ships. We swarmed up the side of that old hulk like pirates of old. Boy, oh, boy. There was enough hardwood in the deck of that one ship to floor all the grocery stores in California.

The boatman knew all about the old ships and who owned them. I think he thought we were crazy but he gave us the address of the owner. It was across the Bay in Sausalito. We broke every speed record in the book getting to that address. The wait for the Richmond to San Rafael ferry seemed interminable, but at last we were across the Bay and tearing down the highway to Sausalito. We stopped at a gas station to ask how we could find the place. "You can't miss it," the station attendant told us. "It's a little house way up on top of the hills and overlooking the ocean. Just follow this road and you will run right into it." We found the house without any trouble. We didn't stop to make any plans, or work out an approach, but just barged up to the door and rang the bell. It's a good thing the old-timer who owned the ships wasn't a sharp-shooter, or he would have had us over a barrel the way we went at it. But he wasn't. He was a swell old fellow, and when we calmed down enough to tell our story he said: "Sure you can have the hardwood, if you can use it. I bought those old hulls years ago and stripped them of anything I thought was of value. Go ahead and take what you want. I'll give you a letter authorizing you to go ahead and make a deal. If, and when, you

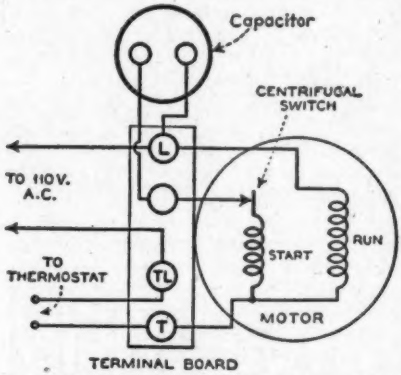
(Continued on page 78)

SERVICE POINTERS

A department for the exchange of ideas on new devices and methods of improving service work. Five dollars is paid for each pointer published. Write up your idea today and mail it to the Service Pointer Editor.

MOTOR FOR AN EMERGENCY

Split phase motors, the kind used on washing machines, are not suitable for refrigeration work because they do not have sufficient starting torque. It is possible, however, to use a split phase motor in an emergency by connecting a condenser in series with the starting winding to increase



the starting torque. A ¼ hp. motor of the type ordinarily used on washing machines needs a condenser of approximately 162 mfd. capacity. A 1/5 hp. will work best with a capacitor of about 148 mfd. The split phase motor should, if possible, have slightly higher horsepower rating for a given job than a regular refrigerator type motor. For example, a ¼ hp. split phase motor with a condenser in the starting winding will work very well in place of a 1/5 hp. refrigerator motor and without noticeable increase in current consumption.—*Submitted by W. L. Cotton, Summers, Ark.*

CAPILLARY TUBE APPLICATION

I HAVE been using capillary tubes in many different applications for several years, and I have a few pointers which may be helpful to others in this field.

Selection of the proper strainer or dryer is of prime importance. Many dryers and strainers are not ample.

A receiver tank may be used with a capillary tube system. This arrangement allows pump down, and also allows the use of a longer tube on low temperature applications without the danger of excessive head pressure, when pulling down a warm box. However, obtaining the correct critical charge is a little more difficult in this instance.

Correct Charging

To correctly charge a capillary system a slight overcharge should first be charged in, and then purged off until the frost line barely comes out of the cabinet. On domestic boxes an overcharge may show up only when the unit first starts up. If it seems to be doing no harm, and disappears quickly, it should be left, as it insures proper oil return and allows for a little leakage in the future. On low temperature applications and others either with or without a receiver tank, the unit should be allowed to pull down to the lowest temperature it might obtain, as it is only then that an overcharge might appear. For instance, I allow a deep freezer cabinet to run until it pulls down to a temperature of 25 below zero. At this temperature practically all the liquid in the system is in the evaporator. If an overcharge has not appeared, I add refrigerant, very slowly, until it does appear, and then purge back. Care should be taken that an apparent overcharge is not caused by oil, or conduction. A dial thermometer clamped to the suction line will clear this up, and if the frost is caused by oil it will soon disappear.

If the tube is too short the unit will not pull down to the desired temperature. However, be sure the compressor and condenser are efficient before blaming this condition on the tube. To remedy this condition without removing the tube, it is sometimes possible to wind the tube in a small tight coil about

five-sixteenths or three-eighths inch in diameter, which causes sufficient reduction in the velocity to cure the trouble.

Testing the System

To test a capillary system, the first step is to pull the box down to a low temperature as mentioned above. Then allow the unit to cycle a few times and observe for overcharge at the beginning of each cycle. Next turn the unit off and allow it to sit idle for a few hours. When it is started up, observe for overcharge, knocking, bucking, or other signs of too much liquid in the high side. Such jumping may be caused by too much capillary, however, it is more likely that there is not enough room in the high side to take care of this surge, (caused by the compressor pumping more gas out of the evaporator than the tube allows to return, as soon as the unit becomes cold, this condition reverses, and all is well). To cure this condition, I use a small receiver or add more condenser.

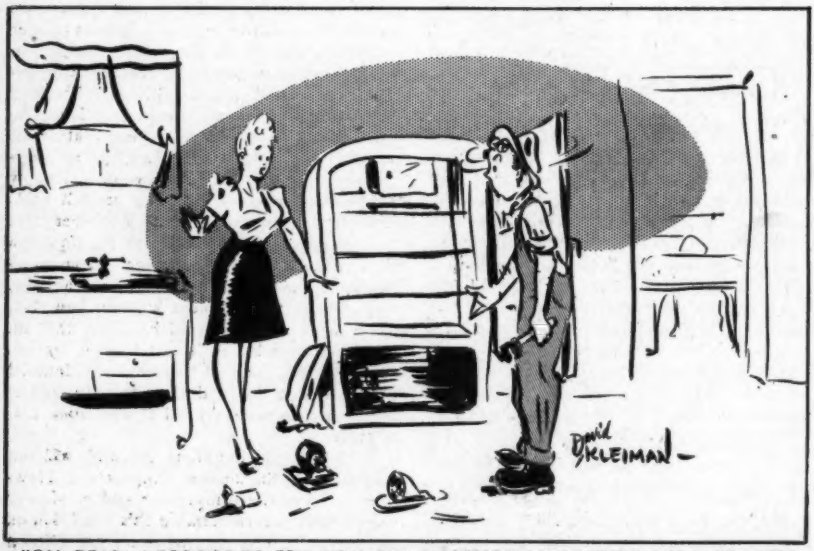
When installing a capillary, never allow the tube to enter directly into the evaporator, or to touch the cold evaporator or tubing in any way. I have found it good practice to end the capillary just outside the cabinet, and carry the refrigerant into the evaporator with a three-sixteenth or one-fourth inch line, providing this line can be well insulated. Otherwise, I place it in the warmest part of the box, well away from the evaporator. This practice eliminates oil congealing or wax separating in the end of the tube.

The capillary makes a wonderful heat exchanger, and may be soldered to, or wrapped around the suction line, providing there is no chance of the line carrying a permanent frost at this point.

A capillary does not work so well on an evaporator designed for a low side float. It works well as a substitute for most high side floats and works very well as a substitute for any expansion valve. In my opinion, it is unsurpassed as a metering device on low temperature applications, if properly calibrated, installed and charged.—*Submitted by J. L. Ammons, Amarillo, Texas.*

\$ \$ \$

ONE family in ten, in a given trading area, can be expected to buy a new refrigerator each year. Take any one average day's floor traffic the store has and divide it by ten, for an example of how much potential business walks into the store each day—and the importance of proper location and proper display is sharply highlighted



"OH, DEAR! I FORGOT TO TELL YOU, THE ELECTRICITY WAS SHUT OFF LAST WEEK. COULD THAT BE THE TROUBLE?"

The problem of discoloration of meats in display cases

By J. H. SPENCE*

FROM time to time letters are received from servicemen complaining about discoloration of meat products, particularly lunch meats displayed on the top shelf of closed cases. These occasional complaints lead us to believe there is not a clear understanding of the causes of this discoloration and the limitations imposed upon any equipment in preventing it.

Without getting into too much of the theory involved, such as the effect of various conditions on the hemoglobin in the meat products, we do want to point out the most important individual cause for discoloration so that the information can be passed along to the users when necessary, so that he in turn will know exactly what to expect.

The most important fact to establish is that strong light, light of high intensity origin from any source, does discolor meat products, not only fresh meats but luncheon meats, particularly those which have been smoked. Light from an ordinary incandescent lamp, from a fluorescent lamp, brilliant daylight, or from the sun will all cause this effect. The fading of meat in no manner effects quality or taste of such products.

We do need light in the case in order for it to serve one of its more important functions, that is, the display of products. The light is good in that it helps the display but it is bad in that it tends to discolor, therefore, good design would call for the proper compromise between these two factors. The intensity of light and the proximity to the source is greatest on the top shelf of a two shelf case, and therefore this is the most critical position. We do not want to sacrifice, for the overall good, the amount of light now provided, but in order to give proper display in the main part of the case, the intensity near the source of the light must be relatively strong.

The only practical solution to this problem is to recognize that the condition exists, that it is not a defect, that it cannot be corrected without sacrificing the sales value of a properly lighted meat display fixture.

This important problem, the effect of light on meat products, has been given special attention by one of the leading factors in the meat industry, in the form of an extensive research project. The results of this research quoted in brief will help you to understand the problem better.

"All meats used in the experiment, except the fresh meats, were shipped under simulated commercial handling, so that the meats were in transit three days. The fresh meats were held at 36 F. from four to six days before slicing."

"During the first three days the cabinet temperatures averaged about 33 F. with fluctuations from 34 to 40 F. The relative humidity was 80%."

"With reference to the table, the terms 'Exposed,' 'Unexposed' and 'Frozen,' described in the test table indicated that the exposed meats were those on the top of the pile, whereas the unexposed meats were within the pile."

"Experiments on Discoloration of Product Displayed"

"The 30-Watt Tubular white fluorescent light was removed from one section of the case and cardboard was used to seal off this section from the remainder of the case. Representative meat items were (1) exposed to the fluorescent light for eight hours each day, for five days, (2) exposed to diffused daylight for five days, and (3) covered with black paper so that light exposure was greatly reduced. All three groups were subjected to the same air conditions. Observations are summarized as follows:

"The cured meat items were much more susceptible to discoloration than the fresh beef steaks."

"Experiment No. 2—The display case was divided into three sections by the use of cardboard. Section I was lighted by a 36-inch tubular, 30-watt fluorescent white light. Section II was lighted with a similar light, however, heavy window glass was used

* Service Manager, Hussman Refrigeration, Inc., St. Louis, Mo.

Table 1—Results of First Test

Produce	Display case light		Diffused light		No light
	(1 day) (8 hrs.) (exposure)	(5 days) (40 hrs.) (exposure)	(1 day)	(5 days)	(5 days)
Sliced Boiled Ham	fading	badly fading	no fading	some fading	no fading
Sliced Meat Loaf	fading	badly fading	no fading	some fading	no fading
Sliced P & P Meat Loaf	fading	badly fading	no fading	some fading	no fading
Bacon 1 lb. later style	fading	badly fading	no fading	some fading	no fading
Strip Loin Beef Steaks	no fading	slight fading	no fading	very slight fading	no fading

to filter out most of the ultra violet rays. In Section III, the fluorescent light was removed and two 25-watt and two 40-watt incandescent light bulbs were installed. The illumination produced by these bulbs was approximately equal to that from the tubular fluorescent light. A light meter indicated that the product was exposed to between 40 and 50 foot candles in each of the three sections."

"Observations were made over an eight hour period with the following results:"

Table 2—Results of Second Test

	Fluorescent Light	Fluorescent Light (window glass filter)	Incandescent Light	No Light
Hours of exposure.....	1 2 4 6 8	1 2 4 6 8	1 2 4 6 8	1 2 4 6 8
Boiled Ham	0 x x x x	0 x x x x	0 x x x x	0 0 0 0 0
Meat Loaf	0 x x x x	0 x x x x	0 x x x x	0 0 0 0 0

Note—0 indicates no discoloration; x indicates discoloration.

"It will be observed that discoloration was first noticeable after two hours exposure to light. No doubt some discoloration had taken place after one hour exposure but it was not sufficient to be readily observed. The degree of discoloration was progressively greater on each inspection over an eight hour period. The window glass filter did not noticeably reduce discoloration."

"The meats exposed to incandescent light were almost as badly discolored as those under fluorescent light. Because of the greater amount of red in the incandescent light, the meat appeared brighter although the display value of the incandescent light was inferior to the fluorescent light. These tests indicate that the nitrosohemoglobin of the cured meat is very susceptible to oxidation by light. The discoloration may not necessarily be the effect of ultra violet light, but in addition, it may be caused by the photo chemical activity of the longer light rays."

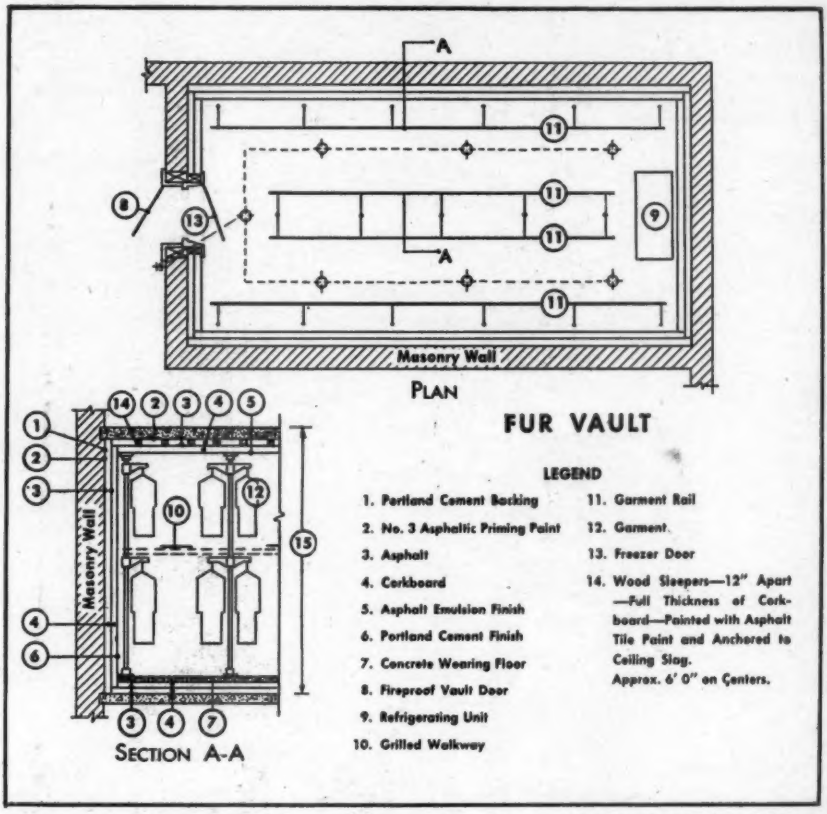
Summary

"In summing up the studies made so far, it would appear from the data that table ready meats, cured meats and fresh meats may be stored for two days or more in self-serve open refrigerated display cases without significant change, except for a change in the color of the cured meats. This change is limited to the lean cured meat and is greatest in items like sliced boiled ham or sliced meat loaf. The color change is barely detectable in colored frankfurters. Fresh meat items are very resistant to color change. The discoloration of product appears to be closely related to the amount of light and the indications are that filtering out the ultra violet light would not solve the problem."

"Discoloration of meats would be a problem in stores where the turn over was slow and the meats remained exposed to the dis-

(Continued on page 76)

Construction Details of a
Cold Storage Fur Vault



Drawing by Armstrong Cork Co.

MANY modern fur storages pack a two-way temperature punch of such potency that insect eggs and larvae can't survive.

Literally lethal chambers for the pests that prey on furs, these storages are operated at 15 to 20 F. for three or four days, then raised above 50 F. for a day or two, then dropped to 15 to 20 F. again for two or three days, and finally held at a constant temperature of 35 to 40 F.

Two or three repetitions of this cycle during the early part of the storage season will insure complete destruction of moths, eggs, and larvae. It is here that these storages differ from the storages which have a constant temperature of about 30 F. and might only hold insect life dormant. Research has disclosed that moth life just can't stand the shock of becoming active at 50 F. and then suddenly being subjected to temperatures ranging from 15 to 20 F.

To force air of the proper temperature between tightly packed garments, a refrig-

IT HAD TO BE RUGGED
FOR RAIL AND HIGHWAY SERVICE

your service work is easier

...because A-P refrigeration valves are DEPENDABLE

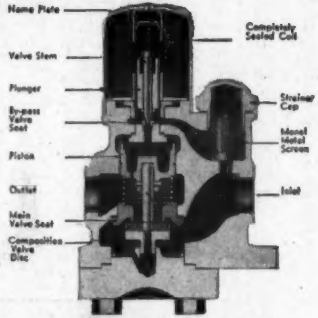
The first air conditioned streamliners to race over the rails used the A-P Model 70-NA Solenoid to control refrigerant in their air conditioning systems. Further test of its rugged strength, leakproof safety and trouble-free service came from busses, trucks, ships, and other mobile units as well as all types of large air conditioning and refrigeration installations everywhere.

An "11 pound handful", the Model 70-NA measures only 7¼" high by 3½" wide. In spite of its large capacity, up to 20 tons Freon, it requires surprisingly little power to operate. Current is needed only to open a small by-pass, allowing refrigerant to pass into the chamber above the main piston. Pressure then forces the piston down, opening the main valve without additional electrical power. This feature, plus the use of the A-P "impact type" plunger in the by-pass, means easy and efficient opening under high pressure.

Few, if any, solenoids can give you the wide range of application provided by the A-P Model 70-NA. For instance, it offers three flange sizes — ⅜", ¾" and ⅞" — A.C. voltages of 20, 24, 115, or 230, and 25, 50 or 60 cycles. Also 6, 12, 32, 64, 115, 230 volts D.C.

Put the rugged DEPENDABILITY of the A-P Model 70-NA to work for *your* benefit on large installations of every kind. Your jobber carries it in stock—or write for Bulletin 402-A.

A-P Model 70-NA Solenoid Refrigerant Valve
With wide range of flange sizes, voltages and cycles—for applications up to 20 tons Freon.



Cross Section of Model 70-NA Solenoid showing by-pass principle, and other construction features.

AUTOMATIC PRODUCTS COMPANY

2484 NORTH THIRTY-SECOND STREET • MILWAUKEE 10, WISCONSIN
EXPORT DEPARTMENT: 13 EAST 40TH STREET • NEW YORK 16, N. Y.

A-P Dependable REFRIGERANT VALVES

STOCKED AND SOLD BY GOOD REFRIGERATION JOBBERS EVERYWHERE . . . RECOMMENDED AND INSTALLED BY LEADING REFRIGERATION SERVICE ENGINEERS

erated air-blast unit is usually used within the vault. Humidity is maintained at from 55 to 65 per cent to prevent the skins from drying and to maintain them in prime condition.

The construction diagrams illustrate some of the details of a typical insulated cold storage fur vault designed to be operated either by cycling the temperature or maintaining a steady low temperature.

As the vault may be loaded with thousands of dollars worth of valuable furs, potential fire and burglar loss is considerable. For this reason the walls, floor, and ceiling should be substantial and constructed of fireproof material. A reliable, insulated fireproof vault door is used at the entrance. The inner door should be a well-made freezer door.

Moisture Can Cause Damage

Except for unusual climatic conditions, insulation ranges from 4 to 6 inches of corkboard or its equivalent. Masonry walls should be thoroughly waterproofed with No. 3 asphalt paint to eliminate moisture infiltration into the insulation. Moisture reduces effectiveness of insulation and accentuates frost accumulation which could cause drippage during the warm-up cycle (where this system is used), with possible serious damage to the stored garments.

Severe moisture infiltration also can occur if the door to the fur vault opens directly into heated or humid spaces. If this condition exists, a preconditioning vestible large enough to accommodate a hand truck and a swinging door should be added to minimize infiltration of outside air.

A durable portland cement finish, scored on approximately 4′ centers to reduce cracking, is used on the walls and an asphalt emulsion finish is used on the ceiling. The wearing floor is concrete.

Air Circulation

Garment rails are usually installed in two or more tiers with sufficient space between centers to allow for aisles. The top tiers are serviced with grilled walkways. This rail equipment should be constructed on structures entirely within the room to eliminate perforations in the insulation. For this same reason, electrical conduits should be brought into the vault through the wall in which the door is set and the leads distributed throughout the room on the underside of the insulation.

As it is customary to hang five or six garments to the foot, ample space must be allowed at the top and bottom of each tier to allow for air circulation.

Asphalt Construction Important

Today most insulation is erected in hot asphalt. The casual observer regards the asphalt only as an adhesive. Actually it has a function far more important than that. Its primary purpose is to stop the infiltration of air and moisure.

Few people realize that walls of ordinary construction are extremely porous. It's a real surprise to learn that one square foot of an average 13-inch brick wall can allow enough air (at 40-lb. pressure) to pour through in an hour to fill a 4.83-foot cube, even though the wall was plastered with ½" portland cement.

Until 20 years ago, almost all insulation was erected and finished with portland cement, and this construction was adequate for the approximately 32 F. temperatures being used during this period. But as the use of lower temperatures became prevalent, air infiltration through the relatively porous portland cement was the cause of many insulation failures. The crux of the problem was the moisture carried by the air. This moisture froze after lodging between the building walls and the insulation, and the pressures exerted by this "icing up" literally pushed the insulation away from the wall.

After a thorough study of conditions in all types of cold rooms, a special asphalt that had all the qualities to solve the moisture infiltration problem was found. This asphalt was a better adhesive than portland cement and its permeability to air was practically zero.

As used today the asphalt specification consists of a heavy coat of asphalt priming paint applied to a portland cement back plaster with the insulation erected against this surface in the special hot asphalt.

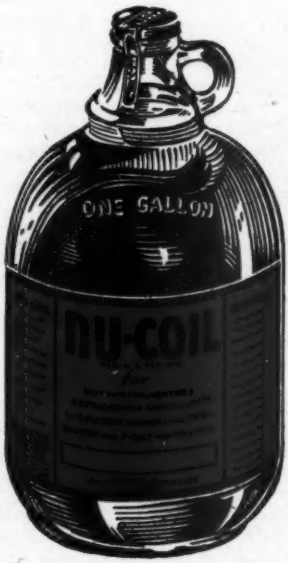
Although the portland cement back plaster is used mainly to prepare irregular masonry walls to provide a true and level surface, it also functions as a partial air barrier against soft and porous masonry construction. The priming paint, designed to penetrate the plaster and key to it, has, in turn, a threefold purpose. It reinforces the air seal, bonds thoroughly to the plaster, and provides a satisfactory base for bonding with the hot asphalt when the insulation is erected. The erection asphalt not only acts as the adhesive but also serves as a positive barrier against air.

NU-COIL

Reg. U. S. Pat. Off.

SCALE SOLVENT

OFFERS IMMEDIATE RELIEF TO REFRIGERATOR EQUIPMENT WITH LOW EFFICIENCY AND HIGH OPERATING COST. NU-COIL RESULTS ARE SURPRISINGLY LOW IN COST AND OFTEN THE SAVING IN ELECTRIC CURRENT ALONE PAYS FOR THE DESCALING OF COILS.



FOR

CONDENSER COILS
REFRIGERATOR DRAINS
UNIT COOLERS
SPRAY HEADS
VALVE PLATES
CONTROL VALVES
STUCK COMPRESSORS
EVAPORATOR FINS
WATER COOLERS

YOUR WHOLESALER WILL SUPPLY NU-COIL

SKASOL CORPORATION

113 Glencoe Ave. **Webster Groves 19, Mo.**

QUESTIONS and ANSWERS

On Problems of Servicing and Installation of Refrigerating Equipment—Send Your Problems to the Question Box.

COMMENTS ON QUESTIONS

REFERENCE TO QUESTION 777—I am of the confirmed belief that the faulty discharge valve was the cause of the crankshaft failure. It should take but a small stretch of the imagination to picture what a terrific beating the crankshaft withstood while operating with one faulty discharge valve. Under this condition one piston on its downward path was subjected to full head pressure, 160 lbs. per sq. in. perhaps, for full length of the downstroke with no compression cushion to arrest its motion at its end. This tremendous force which was partially stored in flywheel and motor and paid out again on the upstroke, was, of course, transmitted through the crankshaft.

Were it possible to put this compressor with its faulty valve operation under a Stroboscope, I am sure you would have found a jerky motion at each cycle of operation of the crankshaft. This jerky motion would have been more evident had the belts been removed from the compressor, and flywheel pulled over by hand. The repairman would have experienced much difficulty in pulling the wheel over with piston of faulty cylinder on the upstroke. Immediately after this piston passing the top center it would have been driven suddenly downward as a result of the 160 lbs. psi. or so head pressure acting thereon. This erratic motion—too quick to be conceived by the eye nevertheless prevailed—directed a riveting hammer tattoo until such time as the shaft-metal reached its point of fatigue.—*Michael J. Corkery, Chief Engr., National Geographic Society, Washington, D.C.*

REFERENCE TO QUESTION 779—This concerns the second problem of this question which is about the ice cream cabinet. Assuming the motor, heater coils and power supply are OK, probably he is getting liquid slugs or a combination of liquid and oil slugs due to improperly adjusted thermostatic expansion valve or due to the suction line forming a trap between the coil and the compressor. Although not stated in the question, possibly the compressor is installed at the end of the hardening cabinet and the outlet from the cabinet is lower than the suction port of the compressor.

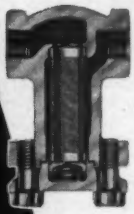
I had a call several years ago to a locker plant where the compressor (2 hp. Brunner) on the sharp freeze plates was stalling on the start. I found the plates had a top feed and there was a bad trap in the suction line. The trouble was cured by a "trombone" inserted in the suction line just ahead of the compressor. This can be done on the job, with the usual equipment carried by every serviceman, and will save a lot of trouble on these jobs that have a low suction outlet on the fixture. The important feature about the "trombone" is the inlet must be 4 to 6 inches above the outlet and the outlet must be as high or higher than the suction port of the compressor. Also add enough oil to fill the lower half of the "trombone."—*G. I. Richardson, Lake Bronson, Minn.*

REFERENCE TO QUESTION 779—May I offer the following solution to the ice cream cabinet problem of question 779. I suggest the trouble is a leakage through the discharge reeds of the valve plate. As can be seen by the sketch, this leakage will not be noticed on the low side gauge due to the fact that the suction discs are doing a good job of seating, the piston makes a good fit and the gauge isn't connected to the point at which the pressure increases. Force "A" in the drawing tends to close the suction discs in the valve plate and exert a downward force on the pistons, which is causing

For Ammonia

IMMEDIATE DELIVERY ON MANY ITEM

For more than a quarter century, the continued preference shown in the refrigeration and industrial fields for premium-grade Henry Valves, Fittings, and Accessories can be traced to the exclusive patented features of design and construction found in many of the Henry Products.



SCALE TRAP OR STRAINER
Large capacity with spring tensioned self-centering and removable screen. Choice of 50 or 100 mesh. Sizes ¼" to 2" inclusive.

GAUGE GLASS ASSEMBLY
For compressor crank cases and liquid storage tanks. Slotted gauge glass guards. Ball check valve in inlets automatically shuts off flow if the glass should break.

Screwed Bonnet Type Valve

LINE SHUT-OFF VALVE
More compact because the bodies are made from die cast permanent mold iron of close grain structure. Two piece stem construction. Floating disc has soft metal insert which rotates on stem. Sizes 1¼" to 2" inclusive.

PRESSURE RELIEF VALVE
Accurate release and positive reseating action. Soft alloy metal seat and extended stem permit emergency reseating without removing valve from line. Sizes ⅜" to 2" inclusive.

SOLD BY JOBBERS EVERYWHERE

Cable: HEVALCO Chicago

Bolted Bonnet Type Valve

HENRY VALVE COMPANY 3260 WEST GRAND AVE. CHICAGO 51, ILLINOIS

CONTROL DEVICES, VALVES, DRIERS, STRAINERS AND ACCESSORIES FOR REFRIGERATION AND AIR CONDITIONING AND INDUSTRIAL APPLICATIONS

the starting trouble. I have had exactly the same trouble on a Brunner unit connected to a dry drink box.

There is another point in connection with this question, which might bear discussion. Since this compressor is hooked to a low temperature fixture, isn't it possible that at the time the compressor stops there is left in the piston chamber cooled liquid refrigerant that could expand due to the warmer head and cause this same condition? This pressure could rise to a point as high as the head pressure and would tend to close the suction disc, also.—*Garnett Underwood, Hopkinsville, Ky.*

MAJESTIC RELAY

Question 783: I received a call to service a Majestic domestic refrigerator. I have tried several times to start the unit—it runs a few seconds, the motor not reaching its normal speed when the overload trip breaks the circuit, thereby stopping the motor. There is an unusual hum in the thermostatic control box. This seems to me like electrical disturbances in the compressor, electrical condenser, or phase shifting transformer. Will you please tell me if there is a way for me to test the electrical condenser and phase shifting transformer? This refrigerator is about fourteen years old. Your help will be greatly appreciated.

Answer: The description you have given me of the trouble with your Majestic unit leads me to believe that it is caused by dirty contacts on the relay, or to a defective relay. The noise is very likely chattering of the relay and chattering is usually due to improper adjustments or to dirty contacts.

There are, however, other possibilities of trouble and we will try to enumerate them as we go. First—the line voltage, if it is either too high or too low, can cause the trip to kick out. The line voltage, of course, should be checked with a volt-meter. Second—the relay may not be operating properly. To check the relay note the operation when the unit is started. When the unit starts the weight below the coil should be lifted so that contact is made by the point on the arm against the upper contact. In this position the upper end of the plunger rod should be free of the arm. If the current continues to flow and the unit does not start, the overload trip will cut out. When the motor reaches running speed, current drops to normal. With this decreased ampere flow through the starting relay coil the weight will drop. This is the correct running position. The freeness of the armature screw should be checked when starting. If it is not free and cannot be readily adjusted, the entire starting relay assembly may have to be replaced.

Third—the electrical condenser may be defective. This can be tested for open circuit by connecting a test lamp across the two terminals, or as a positive means of determining its condition it might be well to temporarily replace with a similar condenser which you know is not defective. Fourth—the transformer may be defective. The transformer may be checked for grounds or shorts in the usual manner with a test lamp.

There are various other causes of the unit cutting out on the overload cutout, such as air not circulating through the condenser, condenser fan not operating properly, a stuck shut float valve, or a defective compressor. Then, too, the motor windings should be checked for shorts or grounds. This may be done through the terminals on the outside of the dome.

RETURNING OIL

Question 784: Is there a practical method of causing the oil in a Norge Rollator unit, with low side float, to return to the compressor from the float chamber where it is lodged, with a minimum of servicing? Our service facilities are rather limited as yet and we haven't the means of dryng out the float if we took it off to remove the oil.

We have run the unit and applied small amounts of heat to the evaporator with a torch. The Rollator is a new one which we installed and we do know we lost an ounce or two of SO_2 while doing this. Because of our lack of experience, we didn't know this lack of correct charge would cause the float to get logged. We know now this was from an undercharge. We would greatly appreciate your help.

Answer: Ordinarily it should not be necessary to do anything to a low side float system which has become oil logged other than what you have already done, plus adding sufficient refrigerant to bring the charge up to normal. In other words, if you add refrigerant to the system so that there is a reserve in the receiver, then apply heat to the evaporator to start the refrigerant and oil mixture boiling, the float should open and admit liquid refrigerant which, in turn, would force the oil to return to the compressor.

ENGINEERED
to fit..
FORGED FLARE NUTS
AND FITTINGS
Prompt Shipment on most items
Electrimatic
2100 INDIANA AVE CHICAGO 16 ILLINOIS

Where it is necessary to hurry this procedure and be sure of getting some of the oil out of the evaporator, you can loosen the hanger bolts and allow the front end of the evaporator to tip down until the oil floating on top of the refrigerant, will flow directly into the return line. On straightening up the evaporator again, the float should open up admitting liquid refrigerant and, providing the calibration of the float is correct, there should be no further oil logging.

Failing any of these attempts at clearing the evaporator, you may find it necessary to take the float apart and recalibrate it. In other words, the float arm will have to be bent slightly upward so that the liquid level is at a higher point when the float shuts off the flow of refrigerant into the evaporator.

FAILURE AFTER DEFROSTING

QUESTION 785: What causes a great many refrigerators to stop operating properly immediately after defrosting the cooling unit or units? This condition exists in the best of them—commercial and domestic. Sometimes for only short periods, then again the period seems to be permanent (to the user, at least).

Often times a sudden jar of the unit or box, or refrigerant lines, condenser, receiver or cooling unit does the trick. Again I find it necessary to flush refrigerant control lightly. Most anything you want to try seems to do the trick at times. I believe that this is some condition that the oil goes through in a period of time, or just gets dirty or waxy. What is your idea of this condition?

ANSWER: There are several reasons that I can think of off hand which may cause a refrigerating unit to fail immediately after defrosting. First of these is moisture which may be held in the form of crystals in the evaporator while the unit is operating, but will melt during refrosting and return through the system when the unit is restarted. This moisture would then affect the metering device used in the system. 2—Wax formation clinging to the inner walls of the evaporator will dissolve during defrosting and return through the system and may clog the metering device. 3—The needle of an automatic expansion valve may be forced into the seat due to the high evaporator pressure while defrosting, where the needle may stick until jarred loose.

4—Air in a high side float system will bind the float, thus preventing the entrance of liquid, and even though the system may operate satisfactorily while the evaporator is frosted, the air may cause trouble on starting up and not be noticeable once the evaporator is again frosted. 5—The additional strain placed on all parts of the system during the start-up period after a prolonged shut-down may cause weakened parts to fail.

STORAGE OF MICROFILM

QUESTION 786: In the storage of Microfilm what should the correct humidity and temperature be? Also in air conditioning of a Microfilm storage, would you suggest using water alone or a brine mixture? If a brine mixture is used what would be satisfactory and what percentage should be used?

On this particular installation there has been a brine solution of some kind and there is a very dirty sludge and rust accumulation in the circulating system. What kind of solvent should be used in a system of this kind? We are installing a new coil to replace one which is corroded and eaten away very badly and would like this information before we start this equipment again.

ANSWER: It seems that there is very little information available on the storage and air conditioning of Microfilm, and what little information is available seems to be very indefinite as to temperatures. For example, our source of information states that for general film storage room temperature is depended upon, with a fixed humidity of 50% subject to close control with forced circulation of conditioned air. This, we assume, means that the humidity is of much more importance than the temperature, and it would seem that the temperature in this case would mean approximately 70°. Outside air and the use of cold water supply humidifiers are recommended, and winter temperatures as low as 40° F. may be used.

If the temperatures are to be as high as 70°, or in other words, if the coil temperature is to be maintained at above freezing temperatures, we think that water would be the best solution to use in the circulating system. You may find, however, that it will be necessary to use some type of water treatment to prevent, as far as possible, liming of the coils. Nu-Coil, a product of Skasol Corporation, or other such compounds, should be suitable as a cleaning agent for the system and as a solvent for the scale and deposits on the coils.

One of the twenty-one refrigerators at Fulton Fish Market. Refrigerating equipment was installed by the Lipman Refrigeration Co., Inc. of New York and the general construction contract was placed with the Keating Construction Co

Either 0° F. OR 35° F.

MAINTAINED *automatically by* THERMOBANK

AT FULTON FISH MARKET

Each of the twenty-one new cold storage rooms at the Fulton Fish Market can be operated either at 35° F. for fresh fish or 0° F. for frozen fish. To switch from one temperature to the other it is only necessary to set the thermostat at the desired point. *Operation is entirely automatic,* including low temperature defrosting. The KRAMER THERMOBANK SYSTEM keeps the coils frost-free and efficient at all times, defrosting regularly on a predetermined time schedule. No attention whatever is required; no valves or switches need be manually opened or closed. No ice needs to be removed from coils or plates by brushing, chipping or scraping. No work, skilled labor or attention of any kind is required.

HOW THE THERMOBANK OPERATES

Essentially, the THERMOBANK SYSTEM of automatic self-defrosting consists of a forced convection cooling unit, automatic time controls and a heat reservoir. A portion of the heat extracted during the refrigeration cycle is "banked" in the reservoir from which it is released to the refrigerant during the defrost cycle.

For complete information and valuable low temperature application data, send for Catalog 16.

No. 17 KRAMER TRENTON CO. TRENTON 5 NEW JERSEY

BOOK REVIEW

THE HOME FREEZER HANDBOOK, by Gerald John Stout. Published by D. Van Nostrand Co., Inc. 345 pages. Price $3.95. Thoroughly illustrated. For sale by Nickerson & Collins Co., 433 North Waller Ave., Chicago 44, Illinois.

This book has been written entirely from a practical standpoint and presents only those aspects of the subject which are important to the people who are going to use food freezing in a practical way in their own home. Wherever possible, the methods used by the author have been stressed because most of them have been arrived at after considerable experimentation and after other less satisfactory methods have been discarded.

The information on freezer construction has been presented with the assumption that the reader is somewhat mechanically minded but knows nothing about the subject of refrigeration. No attempt has been made to give all the information available on this subject, however. Large cold storages have not been discussed, nor have milk coolers, kitchen refrigerators, or other equipment of this type.

Included in the book are such suggestions as uses for freezers in the future; how much freezer space does a family need?; what is the cost of frozen foods?; advantages of building a freezer; buying a factory built freezer; building a home freezer; types of freezers for home construction; plan for a chest type home built freezer; constructing the freezer box; insulation for use in a home built freezer; installing the coil and equipment; special "don't" suggestions; and many other suggestions of interest to the man building or buying a home or farm freezer.

LEARNING TO WELD

LEARNING TO WELD, published by the Lincoln Electric Co., Cleveland, Ohio, 32 pages, 5½" x 8½", 83 illustrations including photos and drawings, bound in good quality paper cover, price postpaid anywhere in U.S.A. 25c per copy, elsewhere 35c per copy.

"Learning to Weld," provides a simple basic approach for anyone interested in making a start in arc welding. The booklet's purpose is to teach how to weld and to assist in applying arc welding to the repair of broken parts, the hard surfacing of worn parts and the building of miscellaneous equipment. From the information contained in the booklet, the person interested in arc welding gains clear insight into important aspects of the subject on which he may add further knowledge as he desires.

Subjects treated include the following: protective clothing and equipment; striking the arc; various welding positions; types of welds; fit-up of parts; procedures for various welds including fillets in horizontal, flat, vertical and overhead positions, butt welds, lap welds, corner and edge welds.

PLUMBING AND PIPE FITTING CONTRACTORS FORM NEW ASSOC.

A CERTIFICATE of Incorporation under the "General not for profit corporation act" of Illinois has been issued to the, United Associated Employers of The Plumbing, Pipe Fitting and Sewer Industry of the United States and Canada, with headquarters at 5352 Broadway, Chicago 40.

The purposes of the new association are: "To form a voluntary association for the dissemination of credit information, sources of supply, representation and bargaining power in labor contracts and disputes, to co-operate for the improvement of lien laws for the credit protection of contractors, wholesalers and manufacturers of every branch of the plumbing, pipe fitting and sewer industry and for the improvement of safety and sanitation laws regarding public health and safety, by bringing about better processes, manufacturing and installations of plumbing, heating, refrigeration, air conditioning, ventilation, sources of water supply and sewerage disposal of all types and kinds, to hold and maintain our classification in the industry, to raise the standard of the industry towards public health protection; to better protect the public interest."

WYOMING TAX BILL KILLED

THE Wyoming legislature has killed a bill which would have required Wyoming industrial firms to pay the state's two per cent use tax on commercial refrigeration and air conditioning equipment purchased outside of the state. The measure, introduced by Representatives Frank Mockler of Fremont county, and Earl Chamberlain of Goshen county, would have eliminated certain exemptions on machinery and equipment now allowed under the state use tax law, which exempts equipment which is not carried by Wyoming dealers.

1st with 2-Pole Construction

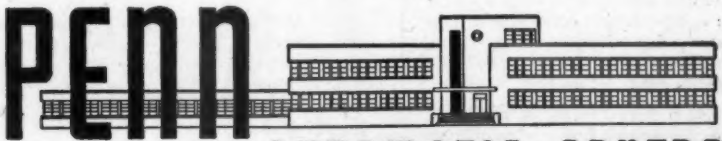
This NEW PENN CONTROL

Series 270 and 272 PENN "Single" temperature or low side pressure controls. Also (not shown) Series 271 and 273 PENN "Dual" Controls which combine in one unit a temperature or low side pressure-actuated mechanism and built-in high pressure safety cut-out.

Yes, this new PENN 270 Series Control is *the first and only control* to incorporate a load-carrying, 2-pole switch. This means that refrigeration and air conditioning men can now control polyphase motors of 3 h.p. and under (where protection against single phasing is provided) without line starters.

This new and different control can control multiple refrigeration systems. It can control two separate load circuits. And when wired in single phase circuits as a 2-pole switch, the PENN 270 always breaks the "hot" line.

Be sure to get the whole story on this better control today. You've never seen so much versatility, simplicity, efficiency and dependability in one control before. *Penn Electric Switch Co., Goshen, Ind.* Export Division: 13 E. 40th St., New York 16, U.S.A. In Canada: Penn Controls, Ltd., Toronto, Ont.



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

NEWS and ACTIVITIES

Announcements of the activities and educational work of the International Society and Local Chapters appear in this department.

COMING CONVENTIONS

R.E.W.A. Midwest Meeting
Place: Broadmoor Hotel
City: Colorado Springs, Colo.
Date: June 5, 6
Secretary: L. W. Krueger

Alabama Association
Place: Admiral Semmes Hotel
City: Mobile, Alabama
Date: October 17, 18
Chairman: T. O. Cooper, Harris
Chairman: T. O. Cooper, Harris Supply Co., Mobile, Ala.

National Locker Convention
Place: Municipal Auditorium
City: Kansas City, Mo.
Date: September 25, 26
Director: R. R. Farquar, 656 Insurance Bldg., Omaha, Neb.

R.E.W.A. Spring Meeting
Place: Edgewater Beach Hotel.
City: Chicago, Illinois.
Date: March 20, 21, 22.
Exec. Secretary: H. S. McCloud, 920 E. McMillan St., Cincinnati 6, Ohio.

R.E.M.A. Spring Meeting
Place: Edgewater Beach Hotel.
City: Chicago, Illinois.
Date: April 9-12, incl.
Exec. Secretary: R. Kennedy Hanson. 1107 Clark Bldg., Pittsburgh, Pennsylvania.

California Assn., R.S.E.S.
Place: Hilton Hotel. (Exhibits: Long Beach Municipal Auditorium).
City: Long Beach, California.
Date: April 25, 26, 27.
Secretary: G. S. Kennedy, P.O. Box 921, Sacramento, California.

R.E.M.A.—All-Industry Exposition
Place: Cleveland Public Auditorium.
City: Cleveland, Ohio.
Date: January 26-29, incl., 1948.
Secretary: R. Kennedy Hanson, 1107 Clark Bldg., Pittsburgh, Pennsylvania.

THREE NEW CHAPTERS IN STATE OF CALIFORNIA

RECENTLY formed chapters in California include the Arrowhead Chapter in the Riverside-San Bernardino area; Oakland Chapter, Oakland, and Hub Chapter, Compton.

New officers of the Arrowhead Chapter are: President, Ray Zimmer, San Bernardino; Secretary, Phil B. Montgomery, Riverside; Treasurer, E. L. Gilmore, San Bernardino. Other officers include 1st Vice-president, H. E. Kalding, San Bernardino; 2nd Vice-president, Ed Warner, Riverside; Sergeant-at-Arms, David W. Crawford, Colton; Educational Director, Carlton H. Ricker, San Bernardino. Board of Directors: H. G. Bunker, San Bernardino; Frank A. Frazier, San Bernardino; Paul N. Rice, San Bernardino; F. W. McCulley, Riverside; Arthur L. Reynolds, San Bernardino. The chapter starts with fifty-five charter members.

Members of the new Hub Chapter in California

Hub Chapter starts with sixteen members, with Everett F. Brown, Compton, as President; Wm. Byers, Bellflower, 1st Vice-president; Harold D. Casler, Los Angeles, 2nd Vice-president; Dan Kittel, Compton, Secretary-Treasurer; Hugh Foster, Lynwood, Sergeant-at-Arms; Leon Czuchran, Compton, Educational Chairman.

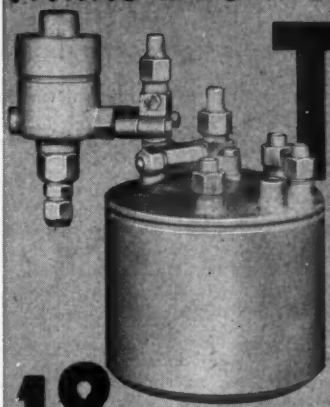
Oakland Chapter has petitioned for charter with sixty-three charter members. The temporary officers are: President, W. E.

Make BIG money in BIG markets

WITH

Temprite

LIQUID COOLERS



18 Models now available!

Temprite

Liquid cooling models have capacities ranging from 3 gallons per hour up to 2,200 gallons per hour.

TYPICAL APPLICATIONS

Industrial or Drinking Water Cooling

•

Chemical Cooling

•

X-Ray Processing

•

Photographic Processing

•

Beverage Cooling

Get acquainted with the wide profit possibilities in Temprite liquid coolers. 18 Temprite models are adaptable to virtually all cooling applications in carbonated beverages, oils, chemicals and countless other industrial and commercial applications.

SMALL BUT MIGHTY

Good things come in small packages and Temprite liquid coolers are no exception. They're highly compact, require minimum space. A model to fill any capacity requirement.

INSTANTANEOUS COOLING

Water coils are submerged in the liquid refrigerant itself and the heat of the liquid being cooled, passes directly into the main body of the refrigerant. Exclusive Temprite design gives instantaneous heat transfer.

WIDE TEMPERATURE RANGE

Temprite coolers are made to fill a wide range of temperature needs. Super-sensitive control valve assures constant temperature under all operation conditions.

TEMPRITE PRODUCTS CORP.

Originators of Instantaneous 80° 40° *Liquid Cooling Devices*

45 PIQUETTE AVENUE DETROIT 2, MICHIGAN

Whortan, Oakland; 1st Vice-president, Walter C. Lippi, Oakland; 2nd Vice-president, Walter E. Hanhy, Oakland; Treasurer, H. R. Burt, El Cerrito; Secretary, C. D. Fagg, Oakland; Educational Chairman, Wm. Wurzbach, San Leandro; Chairman of By-Laws Committee, T. Parr, Oakland; Sergeant-at-Arms, James Wren.

CALIFORNIA PREPARES FOR RECORD MEETING IN APRIL

MARK up another first for the California Association of the Refrigeration Service Engineers Society. The annual meeting of the association, being held in Long Beach, Friday, Saturday and Sunday, April 25, 26 and 27, will inaugurate the First Annual Western Refrigeration Industry Exposition. The exposition and educational meetings will be held in the Long Beach Municipal Auditorium, the finest exhibit hall in that area. Provision has been made for 80 or more exhibits.

Adopting the exposition theme "Promotion Through Education," exhibitors are being encouraged to arrange their displays to show the best methods of installation and service, so that the manufacturers' product will be handled correctly in the field. Convention headquarters will be the Hilton Hotel.

The tentative program now being completed will include the following:

Friday—April 25

Registration.
Tour for Men of U.S. Naval Drydocks and U. S. Battleship.
Tour for Ladies of Southern California and major movie studio.
Educational Program and opening of exposition.

Saturday—April 26

Educational Program and Inspection of Exhibits. Municipal Auditorium.
Tour for Ladies of Catalina Island.
Election of Executive Board and Officers.
Annual Dinner Dance. Hilton Hotel.

Sunday—April 27

Educational Meeting and Final Inspection of Exhibits.
Tour for Ladies to Knotts Berry Place, San Juan Capistrano Mission and Laguna Beach.

The California Association, with fifteen chapters and a membership of nearly one thousand, is extending an invitation to all refrigeration men in the Pacific Coast states to attend this educational meeting and exposition.

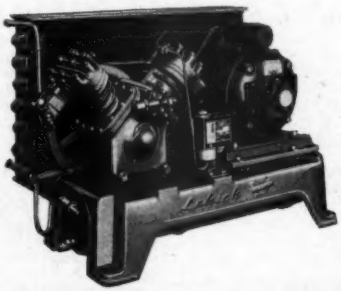
OFFICERS OF CALIFORNIA ASSOCIATION RECEIVE CHARTER AT MEETING OF MAY 11, 1946

Standing, left to right: Director Richard M. Oeberst, Sacramento; Director Larry E. Jensen, San Francisco; Director J. Pat Riley, Long Beach; Director James C. Rodgers, Los Angeles; Sergeant-at-Arms Everett Brown, Compton; Assistant Secretary Lloyd Thomas, Gilroy; President W. W. Allison, Los Angeles; 1st Vice-President Rowland F. Cooke, San Francisco; Paul B. Reed, International Educational Committee, Milwaukee; State Educational Chairman W. C. Irving, Santa Monica; Treasurer M. R. Hanks, San Diego; International Secretary H. T. McDermott, Chicago; Director Ralph L. French, San Diego; 2nd Vice-President A. H. Brundage, Fresno. Seated: Mrs. Gerald Kennedy and Gerald Kennedy, State Secretary, Sacramento; Director John Geringer, Fresno.

"Howdy—Men!"

We are the LEHIGH TEAM

Lehigh BLU-COLD COMMERCIAL REFRIGERATION



You've probably heard a lot about us—and if you get around much you've seen a lot of BLU-COLD units in operation. So it's time we got better acquainted.

BLU-COLD users are telling us that it is one of the most dependable and satisfactory units on the market—and by far the *easiest to service.*

There are two good reasons for that:

1. **PARTS ARE INTERCHANGEABLE THROUGHOUT THE LINE.**
2. **EVERY DETAIL, FROM FLYWHEEL TO VALVE PLATE, IS DESIGNED WITH EASY SERVICING IN MIND.**

Right now we are delivering ¼ to 1 H.P. models. Very shortly we will complete the line up to 5 H.P. So we repeat—let's get to know each other better. Send in your name and address so we can put you on our mailing list.

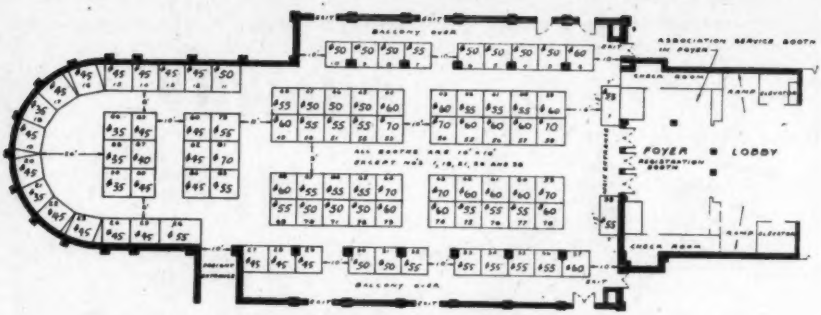
Lehigh BLU-COLD

HEAVY DUTY CONDENSING UNITS

Manufactured By

Lehigh Manufacturing Co.

Plant—LANCASTER, PENNA.



Floor plan of exhibit space in the Municipal Auditorium, Long Beach, Calif.

Details of the convention and exposition are under the supervision of J. Pat Riley, General Chairman, 418 Coronado Ave., Long Beach 4, Calif. International President W. W. Allison, Los Angeles, Calif., of the Refrigeration Service Engineers Society, is also president of the California Association.

* * *

Chapter Notes

• AZALEA CITY CHAPTER, *Mobile, Ala., Jan. 18*—The annual banquet of the chapter was held at the Admiral Semmes Hotel, Mobile, Ala., with members from Birmingham and Montgomery, Ala. Chapters and Pensacola, Fla. Chapter in attendance. Messrs. E. V. Dunbar and Joe E. Parker were visitors. The Honorable E. M. Megginson, City Commissioner of Mobile, gave the address of welcome and commended the members on the formation of an organization whose objective is to provide better service. The annual election of officers resulted in the following: W. L. Anderson, *President;* P. C. Clements, *1st Vice-President;* Leon McMullan, *2nd Vice-President;* G. A. Lamb, *Secretary;* G. M. Elliott, *Treasurer;* and O. D. Johnson, *Sergeant-at-Arms.* Addresses were made by Messrs. Dunbar and Parker, and an educational talk provided by C. S. Tucker, International Director for the southeastern area.

• CHICAGO CHAPTER, *Chicago, Ill., Feb. 11*—Five new members were accepted during this meeting. They are Henry Kelly, Walter Briloga, Harry Erickson, Eugene Suchon and Stanley Grison. Several working committees were appointed by President Riccio, then the meeting was turned over to the educational program. L. C. Keely, Airo Supply Co., gave an interesting talk on the relationship between the serviceman and the jobber.

• COLONELS CHAPTER, *Louisville, Ky., Jan. 16*—One of the films on general service was shown, followed by a discussion on the slides. Bob Luscombe of Penn Electric Switch Co. was the speaker of the evening, introduced by President McKinley. Mr. Luscombe gave an interesting talk on difficulties encountered during the war in the manufacturing of control apparatus for the U.S. Government. He predicted that controls would be in much better supply during the coming year. His company, for one, had increased its production capacity approximately five times that of pre-war days. Quality of the new production should be better because better quality materials are now being received.

• CORN BELT CHAPTER, *Bloomington, Ill., Feb. 12*—After the business session of the evening was completed, the meeting was turned over to Educational Director Gordon Eubanks who gave an interesting talk on heat loads, illustrating on a blackboard how to figure the load on a butcher box in detail. He illustrated the method of construction and insulation, how to select the condensing unit and other equipment, and how to balance compressor and cooling coil. The educational period wound up with a discussion on humidity, participated in by all members present. Ed Riccio, president of Chicago Chapter, was a visitor.

• DAYTON CHAPTER, *Dayton, Ohio, Jan. 23*—This was declared an open meeting and there was little of any business transacted. Since the educational chairman was absent for the evening, the program consisted of a general discussion on service problems.

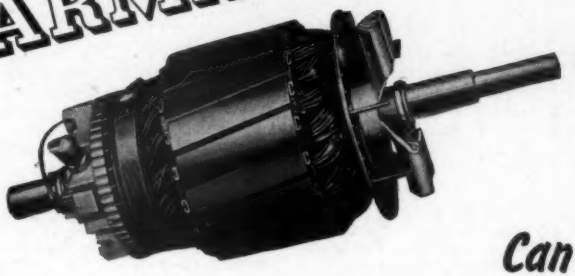
• ELM CITY CHAPTER, *New Haven, Conn., Feb. 7*—About 35 members enjoyed a short business meeting and an exceptionally interesting program provided by Charlie Grote and Art Javes of Sporlan Valve Co. They portrayed the construction of expansion valves and their operation so simply that many new answers to old mysteries were provided. Refreshments climaxed the evening.

• FAIRFIELD COUNTY CHAPTER, *Bridgeport, Conn., Feb. 3*—The entire meeting was devoted to arrangements for the forthcoming annual banquet. Tickets were announced at $3.70 each and Ernest Schultz was elected Master of Ceremonies for the evening.

• FOX RIVER VALLEY CHAPTER, *Fond du Lac, Wis., Feb. 5*—Willis Stafford of Herman

Let's Talk About

ARMATURES!



Can You

Profitably Duplicate This in The Field?

All Wagner Armatures Have:

1. New core iron and windings.
2. New commutators properly undercut.
3. New shafts.
4. New centrifugal short circuiting devices.
5. New rocker arms and brush holder assemblies with brushes.

And Are:

6. Dynamically balanced.
7. Fully tested.
8. Ready to install.

Order Your New Wagner Armatures Today

Wagner motors are world-famous for dependable service. When repairing a Wagner motor, be sure to use genuine Wagner motor parts, designed and built to renew that dependability. Get them from one of the 325 authorized service stations displaying this sign.

Every motor repair shop needs this catalog. It helps you determine the catalog number and price of Wagner fast-moving motor parts. Write for Catalog MU-40 today.

M47-128

Wagner Electric Corporation

EST. WE 1891

6433 Plymouth Avenue • St. Louis 14, Mo., U. S. A.

A view of the speakers' table at the annual banquet held by Azalea City Chapter at the Admiral Semmes Hotel. Left to right they are: C. S. Tucker, International Director; E. B. Dunbar, Manufacturers' Representative; G. M. Elliott, Treasurer; G. A. Lamb, Secretary; J. M. Manley, President of Alabama State Assn.; W. L. Anderson, President of Azalea Chapter; E. M. Megginson, Mobile City Commissioner; M. T. Harris, Associate Member; O. D. Johnson, Sergeant-at-Arms; P. C. Clements, 1st Vice-President; Joe E. Parker, Manufacturers' Representative; and Leon McMullen, 2nd Vice-President.

Goldberg Co. was the speaker of the evening. He gave a talk on controls, then led a discussion on the subject from the floor. The meeting closed with refreshments.

• GOLDEN GATE CHAPTER, *San Francisco, Calif., Jan. 14*—This was a special meeting arranged to hear speaker Paul O. Domke of Mueller Brass Co. He spoke on the subject "Moisture in the Refrigeration System." There were 67 in attendance at the meeting, all of whom found Mr. Domke's discussion on the ways to eliminate moisture from the system with the aid of dehydrators, highly interesting. He also explained the use of different types of dehydrators with each refrigerant.

• HEAD OF THE LAKES CHAPTER, *Duluth, Minn., Jan. 6*—In addition to the usual flow of business matters, movies were shown on the removal and installation of cooling units.

• HOUSTON CHAPTER, *Houston, Tex., Feb. 11*—W. C. Timmerman, Program Chairman, introduced R. A. Booth of the Houston Better Business Bureau. Mr. Booth explained the operation of the bureau as a non-profit organization, outlining its purpose and aims. He was not only a good speaker but a good showman. Fred Brandt of Minneapolis Honeywell Co. was another speaker of the evening, using a pneumatic-control demonstrator to illustrate his talk. He drew diagrams and graphs of the design and construction of the controls, and explained what took place in operation. His demonstration was closed with a question and answer period.

• INDIANAPOLIS CHAPTER, *Indianapolis, Ind., Feb. 5*—The greater part of the meeting was devoted to the members' opinion on where the next annual convention should be held, and on a report of the International educational program. The annual election of officers resulted in the following: L. W. Hartzog, *President;* Noah Mohr, *Vice-President;* E. R. Riches, *Treasurer;* H. W. Hoffmeyer, *Secretary;* E. B. Allen, *Sergeant-at-Arms;* Marvin Reno, *Chairman Board of Education;* J. A. Salter, *Chairman Board of Directors.* Members of Board of Directors: E. W. Wulf, B. E. Hubbard, C. Jennings, P. Briley. The Treasurer's report was read and the books turned over to the auditing committee. Some discussion arose on the forthcoming dinner party and announcement was made that tickets would be $2.00 each. Educational films were shown on the educational program.

• LA CROSSE CHAPTER, *La Crosse, Wis., Jan. 3*—One interesting discussion of the evening was that on the protection of servicemen in the sale of merchandise, particularly packaged equipment. The educational film "Removing and Installing a Cooling Unit" was presented and the usual discussion followed.

At the February 7th meeting, J. H. Spence, Service Manager, Hussmann Refrigeration, introduced his associates, A. P. Wilson, Field Service Engineer for Hussmann, B. H. Karll, Hussmann distributor, Mr. Purcell, salesman for Karll, and Mr. Purdy of Purdy's Refrigeration Service, Tomah, Wisc., who does installation work for Karll in the Tomah area. Mr. Spence proceeded with a talk on the modern trends in the design of self-service display cases and frozen food cases. He illustrated his talk with a showing of films. During the course of his talk he explained in detail the operation of the low temperature self-service case. The last item on the educational program was the showing of the film "Removing and Installing a Compressor or Condenser."

• MEDINA CHAPTER, *Medina, Ohio, Jan.*—The annual election of officers held at this meeting resulted in the following: Elmer Vunderink, *President;* Albert Gehrig, *1st Vice-President;* Leonard Cain, *2nd Vice-President;* N. B. Abbott, *Secretary;* Raymond Dyke, *Treasurer;* E. Blosser, *Educational Chairman.* The educational program included the showing of the film entitled "Removing and Installing a Cooling Unit."

• METROPOLITAN NEW YORK CHAPTER, *New York, N. Y., Feb. 14*—Mr. Holmeyer of Ranco, Inc., was the speaker of the evening on the educational program. Using working models and large drawings of Ranco controls, Mr. Holmeyer gave an interesting illustrated lecture on their construction and operation. He brought out the fact that of all Ranco controls returned to the factory for repair,

a TWIST of the WRIST

Removes the sintered PORONZE filter for efficient cleaning or replacement

- Filters and dehydrates simultaneously
- No felts or organic matter to break down
- Leakproof, sealed and factory tested to insure quality and strength
- Filled with best silica gel obtainable

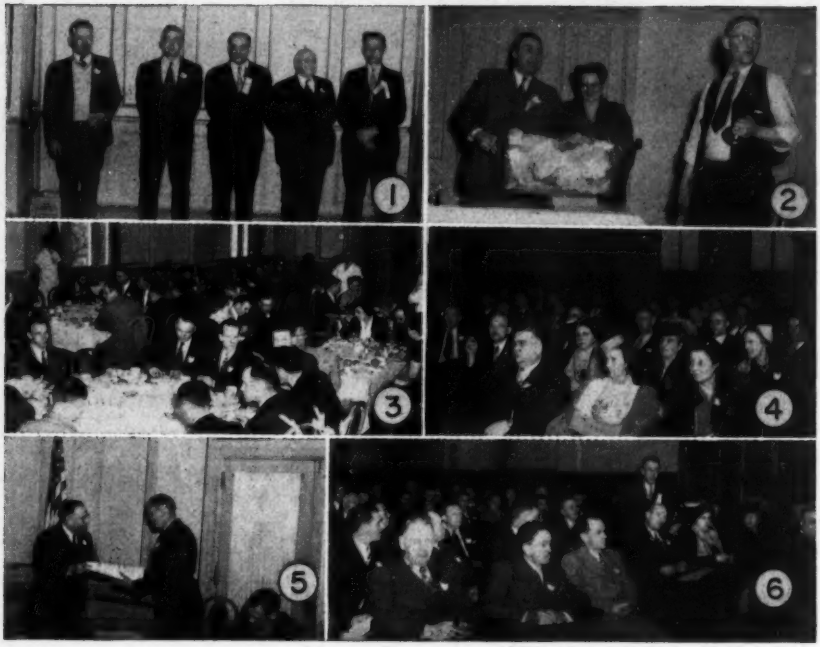
Available in 10, 20, and 30 cubic inch sizes with ¼" or ⅜" SAE fittings.

ORDER FROM YOUR LOCAL JOBBER

WABASH

MANUFACTURING CO.

2642 S. Michigan Ave.
Chicago 16, Ill.



LATE VIEWS OF THE BUCKEYE STATE ASSN. MEETING

1—Buckeye State Assn. officers, left to right: Carl Dieter, Youngstown, Ohio, Treasurer; R. E. Wagner, Piqua, Ohio, Secretary; J. R. Nichols, Jr., Medina, Ohio, President; A. M. Fenwick, Cleveland, Ohio, Educational Chairman; Forrest Poole, Portsmouth, Ohio, Sergeant-at-Arms. 2—Mrs. W. W. Farr, Cleveland, with the help of O. B. Herrick and Earl Yockey picks the lucky winners of prizes. 3—A portion of the crowd at the luncheon session. 4—An interested audience at Battelle Institute hears the first educational session. 5—Past President Earl Yockey receives the charter for the Buckeye Association, as Past Secretary Paul Spring records the event. 6—Another view of the opening session at Battelle Institute. Photos by Howard Grossman, Sec'y. Columbus Chapter.

more than 51% were in working order and another 10% needed only a replacement bellows assembly. The second lecture of the evening, given by Henry Erencrantz of Technical Refrigeration Service Co., New York, was on the subject of repairing sealed units. He discussed the various types of relays, overload protections and the methods of testing them for proper operation. A new type of test meter developed by his company was demonstrated on a Westinghouse unit. He also illustrated the testing of condensers and other parts of the hermetic unit.

• MONUMENTAL CHAPTER, *Baltimore, Md., Feb. 11*—Business was quickly dispensed with and the meeting turned over to the educational committee. "Checking the System" was the film shown for the evening, and before any further discussion on it was held, a vote was requested to determine the desires of the membership in future educational programs. The chapter voted to continue the series of films until their completion. A discussion of the movie occupied some time, after which the merits of licensing refrigeration men was thoroughly discussed.

• NIAGARA FRONTIER CHAPTER, *Buffalo, N. Y., Feb. 14*—About 40 members and guests were present to hear an interesting talk given by Mr. Jennings of Temprite Corporation on Temprite installation and service.

• ONTARIO MAPLE LEAF CHAPTER, *Toronto, Ont., Jan. 17*—After business for the evening was completed, the meeting was turned over to A. E. Doan, Chairman of the Educational Committee. Mr. Doan introduced J. S. Fullerton of Handy & Harman Co., who gave an instructive talk on the application of low temperature brazing alloys. The talk was illustrated through the use of slides showing the various methods of application.

• PHILADELPHIA CHAPTER, *Philadelphia, Pa., Jan.*—The annual election of officers took place at this meeting and resulted in

"...plus more storage capacity."

In addition to the weight-reducing factors inherent in the smaller size of the Mills Direct Drive Compressor, it makes available more useable space within cabinets and other types of self-contained refrigeration units. Without increasing cabinet size, storage capacity can be enlarged because the Direct Drive is smaller proportionately than conventional open-type units.

It retains, however, the easy accessibility of belt-driven models to make "on location" service simple and practical. Add to these distinct advantages the quality symbolic of Mills craftsmanship, and you will see why it will be worth your while to learn more about Direct Drive.

First post-war addition to a distinguished family of air- and water-cooled conde

MILLS INDUSTRIES, INCORPORATED • 4100 FULLERTON AVENUE • CHICAGO 39, ILLINOIS

the following: Robert H. Kell, *President;* Wm. E. Waite, *Vice-President;* and James J. Keers, *Secretary-Treasurer.*

• ROCHESTER CHAPTER, *Rochester, N. Y., Jan. 8*—During the course of the business session, President Snyder displayed a sample windshield sign for the comments of the members. The sign was made up by a local printer in black and white. The arrangement is that signs must go only to members actively engaged in service work. A record of each is to be kept by the chapter and each sign is to be numbered. One copy of the record will go to the police department and another copy to go into the chapter's file. The signs are for the purpose of providing emergency parking for servicemen in restricted areas.

The annual election of officers resulted in the following: George Davenport, *President;* Lewis Nohle, Sr., *1st Vice-President;* Ray Smith, *2nd Vice-President;* John D. Mendell, *Secretary;* James Stevenson, *Treasurer;* A. F. Nagel, *Sergeant-at-Arms;* and John Eggleston, *Chairman Educational Committee.* Board of Directors: Messrs. Sloan, Snyder and Fahey.

• ST. LOUIS CHAPTER, *St. Louis, Mo., Feb. 18*—The greater part of the business session was devoted to a discussion on ways and means of increasing the chapter's activities and improving the condition of the Treasury. On the educational program another of the series of training films was shown. Refreshments wound up the evening.

• SAN ISABEL CHAPTER, *Pueblo, Colo., Feb. 10*—The charter presentation meeting was held in the Bluebird Restaurant. It was preceded by a turkey dinner which proved very enjoyable. Forty-six members and visitors were in attendance. Thirteen of the visitors were from Mile High Chapter in Denver.

• SPRINGFIELD CHAPTER, *Springfield, Ill., Jan. 17*—The installation of officers was made during this meeting. They are: Adolph J. Pasquale, *President;* Jesse Stark, *1st Vice-President;* F. C. Meador, *Secretary;* J. K. Farrelly, *Treasurer;* and Mason Poole, *Sergeant-at-Arms.* Immediately after the installation the meeting was turned over to E. H. Joern of Mueller Brass Co., who gave an educational talk on Mueller products and some of the field experiences of Mr. Joern. He wound up his talk with a demonstration of soldering sweat fittings.

At the February meeting, 42 visitors and members heard P. B. Reed, International Educational Director, speak on the subject "Refrigerant Substitution." The educational program of the International Society was outlined to the members and discussed.

• SUNSHINE CITY CHAPTER, *St. Petersburg, Fla., Jan. 21*—After the business session was completed the meeting was turned over to S. C. Petty, Educational Chairman, who led a discussion on refrigerants with special attention being paid to F-22. This naturally led to a discussion on acid and alkaline conditions in refrigeration systems, and a discussion on two-stage systems.

At the February 3rd meeting, one of the educational films was shown on the educational program and a discussion lasted until 9 P.M., when it had to be halted in order to give the speaker sufficient time. The speaker was J. J. Mitchell of Mueller Brass Co., who explained products of his company and gave a demonstration of welding.

• TALL CORN CHAPTER, *Cedar Rapids, Iowa, Feb. 7*—With a revival of interest in the chapter, active meetings are now being held regularly by the Tall Corn Chapter. Election of officers was held in January and the following are now serving: C. Ray Jones, *President;* M. A. Leoni, *Vice-President;* Calvin H. Moser, *Secretary-Treasurer;* Bob Novak, *Chairman Educational Committee.*

• TWIN CITIES CHAPTER, *Minneapolis, Minn., Feb. 4*—Working committees were appointed during this meeting, including Investigating Committee, headed by Don Frank; Standards Committee by George Klahn; Membership Committee by Lester Ost; Visiting Committee by Fred Phillips; Entertainment Committee by Dean Holmes; Finance Committee by Glen Schwarting; and Entertainment Committee by Edward Asproth. Various other business matters were discussed during the evening and on the educational program the film entitled "The Action of Methyl Chloride on Aluminum" provided some highly educational information. The film was furnished by Ansul Chemical Co.

• WESTERN MASSACHUSETTS CHAPTER, *Springfield, Mass., Jan. 28*—The educational film "Quieting a Noisy Compressor" was the first feature of the educational program, then Mueller Brass Co. conducted a soldering contest supervised by Fran House. Mr. House introduced the contest with a talk on the highlights of successful soldering methods as used today. Twelve men entered the contest, turning out various degrees of success in their work. William Plante acted as timekeeper and Harold Lambert as judge. First prize was awarded to Louis Chmiel, second prize to James Vye and third prize to James Cargel. The meeting finally broke up at midnight.

• WOLVERINE CHAPTER, *Lansing, Mich., Jan. 27*—Upon completion of the business session, the motion picture on the subject of refrigeration was shown on the educational program. Coffee and doughnuts were served after the program was completed.

At the February 10th meeting, an interesting lecture was given by Don Renwick of Michigan State College, on the subject of air conditioning as the feature of the educational program.

• WORCESTER CHAPTER, *Worcester, Mass., Jan. 21*—As reported by Mike Colbert, "Egad—now that we have our own quarters, we wonder what the POOR chapters do on meeting night. It is rumored that the common people have to pay a stipend for the use of an arena to transact RSES business. Our first meeting of the year had a good attendance and the charter members can be proud of their contribution to our development. The most humble in the beaming parade of proud

Double Feature!

TODAY AND EVERY DAY

THAWZONE
PATENTED
PIONEER LIQUID DESICCANT

1. New or reconditioned units, before starting up, should have THAWZONE to destroy those tiny amounts of moisture that even careful workmanship cannot always avoid, and to prevent future trouble.

2. Systems now operating perfectly need THAWZONE now to prevent future moisture. It's economical insurance.

3. Units kicking up from moisture have been treated with THAWZONE by engineers for eight years. It's still good practice.

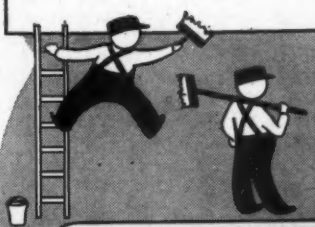
TRACE
REFRIGERANT LEAK DETECTOR

Add TRACE at any time to any refrigeration unit containing any refrigerant to:

1. Find present leaks.
2. Spot future leaks.
3. Locate the source (leaks) of moisture troubles.

TRACE has that vivid, stayred color. It's manufactured by chemists with long experience in refrigeration, who understand the special and exacting requirements that must be met by any additive to a refrigeration system.

. . . and we haven't raised our prices!



HIGHSIDE CHEMICALS CO.
195 VERONA AVE. NEWARK 4, N. J.

members were the workers who prepared the rooms for us. To mention a few—Anderson, Atchue, Savage, Jakstis, McManamy, St. Pierre, Stuart and John Osper.

"The business meeting was routine although that report from Paul Reed's committee was an eye-opener. The members liked the hint about the 'All Makes Service Manual.'

DISCOLORATION OF MEATS

(Continued from page 50)

play case lights for a considerable part of the day. Conversely, in stores where there was a quick turn over of product there would be no discoloration problem."

The only known means of overcoming the discoloration of smoked meats in display cases using the present type of fluorescent lighting is to decrease the light intensity by installing a filter on each fluorescent light tube. This fixture is merely a metal or plastic shell, with perforated holes, that can be arranged to cut down the light intensity from 40% to 60%. These filters will be available at a reasonable cost in the near future.

COLDSPOT FREEZER

(Continued from page 38)

lary inlet to new drier immediately, and pump-down the system, and recharge.

n. Replace baffles and flue.

o. Cap valves on old unit for return to factory.

Cleaning the System

Should the motor of a hermetically sealed unit burn out, it would be necessary to clean the system before installing a new unit. The oil would be discolored black and give off an offensive odor, and it might result in clogging the capillary tube. The capillary would have to be cleaned separately.

To clean the system: a. Disconnect the capillary from the evaporator inlet and connect in its place a piece of tubing long enough to extend to the top of the freezer, and with connections for a service drum.

b. Direct the end of the suction line into a bucket or other container.

c. Pour about ½ pint of carbon-tetrachloride into the evaporator inlet, connect the service drum, and blow through the evaporator until only gas comes out. Repeat at least once or until coil comes clean.

d. Plug coil outlet while still purging, remove tube from evaporator inlet and plug.

e. Remove capillary inlet screen and reflare ready for new screen. Wash out capillary tube in same manner, reversing the flow through the tube. Install new screen and plug the capillary inlet and connect outlet to evaporator inlet.

Checking Oil Level—Conventional Units

To check the oil level: a. Pump out the compressor as for replacing valve plate or seal assembly.

b. Position the flywheel—facing the flywheel, or looking at the end of the shaft on which the flywheel is mounted, turn the flywheel to the position shown in Fig. 13.

This is necessary in order to make sure the counter-weight is out of the way so that a measuring rod will go all the way to the bottom of the crankcase.

c. Remove oil filler plug.

d. Push a clean rod or piece of tubing ¼ inch in diameter through the filler hole, at a slight angle from the vertical, as far as it will go. (4¼ inches).

e. Withdraw and measure the height of oil on the rod as shown in Fig. 13.

f. If the oil level is below that specified in Fig. 13, add a sufficient amount to bring it up to about 1¾ inches.

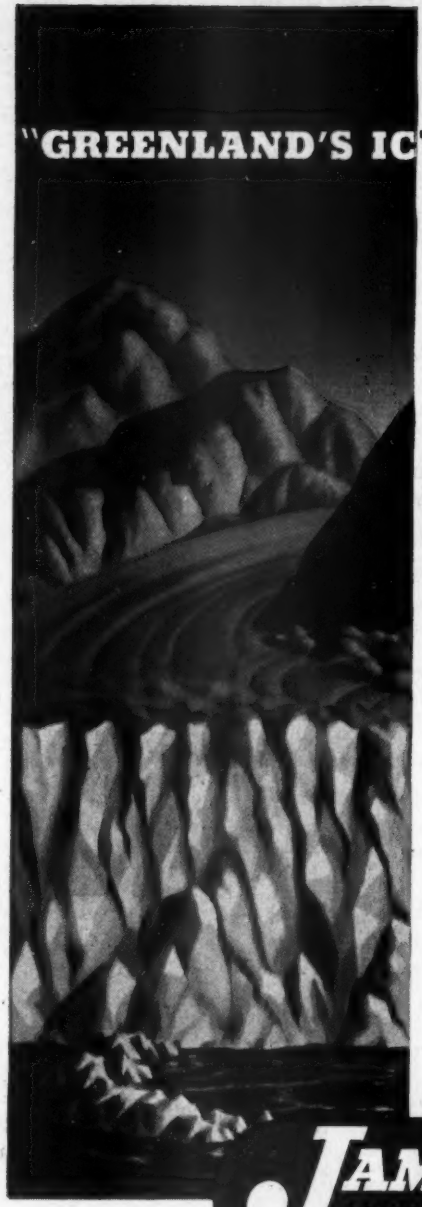
SHIPMENTS OF REFRIGERATION

(Continued from page 39)

value of shipments of other major classes of air conditioning equipment and components increased as follows: centrifugal refrigeration equipment, 28 percent; compressors and compressor units, 16 per cent; condensing units, 10 per cent.

This is the fifth report by the U. S. Bureau of Census in a series beginning with the year 1940, presenting statistics for the air conditioning and commercial refrigeration equipment industry. This is the first release covering quarterly data. Previous releases covered annual and semi-annual periods. In this release only air conditioning equipment and components and accessories for air conditioning and commercial refrigeration equipment are included. Data on commercial refrigeration unitary equipment, except farm freezers, will be presented annually. Farm freezer shipments will be shown on a quarterly basis in an early release which will also include statistics on home freezers.

This release is based on reports submitted by 71 manufacturers. This number is 8 more than the 63 manufacturers included in the corresponding section in the survey for the period July through December 1945.

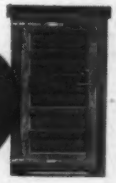


"GREENLAND'S ICY MOUNTAINS"

Prodigal Nature has provided Greenland with an unbroken ice-cap glacier more than 1000 feet thick. The icebergs loosed by its fiords on the North Atlantic would meet the world's refrigerating needs . . . if they could be practically utilized.

As it is, artificial refrigeration must be used. If the openings of refrigerated spaces are not properly sealed, contents are jeopardized and operating costs mount. For nearly half a century, Jamison Cold Storage Doors have satisfactorily solved this problem on thousands of efficient, economically operated installations throughout the civilized world.

The Jamison standard line . . . Jamison, Stevenson, Victor, and NoEqual Doors and related products . . . embraces a wide range of models tailored to most of the requirements of the refrigeration industry. Doors of special design and construction will be built on order. For full information about Jamison Doors for your specific needs . . . and address of nearest branch . . . write Jamison Cold Storage Door Company, Hagerstown, Maryland.



JAMISON
COLD STORAGE DOORS

Branches in Principal Cities, Coast to Coast

This increase was due primarily to the resumption of activity of companies that did not produce during the latter half of 1945 because of scarcity of materials. Of the 71 companies included in the report, estimates were made for a few companies, representing a small portion of the total industry, that did not submit their reports in time to be tabulated. The companies included in the report are believed to represent substantially all manufacturers in this industry.

The tables in this report present information on manufacturers' shipments of air conditioning equipment, and components and accessories for air conditioning and commercial refrigeration equipment. The shipment statistics included in the report apply to equipment actually billed and shipped during the first and second quarters of 1946. These figures are equivalent to completed sales. Complete units delivered on consignment or shipped to a branch warehouse for stock are not included. The dollar values shown are the manufacturer's net billing price, f.o.b., factory.

TOO MUCH BUSINESS

(Continued from page 46)

do make a deal, you can pay me whatever you think the wood is worth. Just send me a check or come over yourselves. I don't have much company, and I'll be anxious to know how you make out. My name is Statler. Captain George Statler.

It was too late to see Tomas that day, but the next day bright and early we went down to his office. For once we were in luck. We found Tomas with the general contractor who had built the stores, and the general manager of the Great Western Grocery Company. I went in alone to put our proposition up to Thomas. They were pretty skeptical about the idea, but after a little argument they agreed to go out and have a look. As soon as they agreed to go Hal, Charlie, and Bill went on ahead to arrange for a launch to take us out to the ship. The contractor rounded up some tools and a couple of laborers, and away we went.

They were still skeptical when we got out to the ship. That is, they were until one of the laborers tried to drive an axe into one of the deck planks. That axe bounced so hard it almost knocked his head off. We went all over that ship testing the planks and timbers. There were a few rotten spots below the water line, but most of the timbers and deck planks were as solid as the day the ship was built. The contractor, Tomas, and the big shot from the Great Western Grocery Company went into a huddle. They came out of it giving orders. The contractor was to have twenty men ready to go in the morning. Tomas was to arrange for a barge and a tow boat. We were to take the big shot to see Captain Statler to verify our authority.

Captain Statler told the big shot that we had full power to act, and that any deal we made would be all right with him. He had papers to prove ownership of the vessels. This was all right with the Great Western's man. He agreed to pay the market price for all lumber used, minus the cost of tearing it out and having it milled. The next day we asked Tomas when he thought we would be able to set our fixtures. "Well," he said. "It will take a few days to tear the lumber out. Then it will have to go to the planning mill for re-sawing and re-surfacing. If all goes well we should be laying flooring in ten days. I'll see that the flooring under the show cases is laid first. Then you can go ahead and set your stuff and we'll test it as soon as possible." It looked like we were all set.

In less than thirty days we had the whole job buttoned up. The tests went off without a hitch. We knew they would. Maybe we weren't very good business men—but we did know refrigeration. Immediately after the tests were run Tomas handed us a check for the first fifty percent payment. He also gave us back the $6,600 deposit we had put up with the bid. It sure looked like a lot of money. We spent the next couple of days paying off our creditors. There wasn't much left when we got through mailing out checks. But we still had $33,000 coming. We'd cleared a nice sum on the contract and The Great Western Grocery Company was well pleased with our work.

Tomas came in to say goodby. "My work here is all done," he said, "and I'm moving on to another job. But I'll be back, and will be looking for your bid on our next job. We're doing a lot more work in this area, but it will be several months before we get around to it. You know, I wasn't going to let you fellows lose out on this deal. We would have given you enough money to put you in the clear if it had come down to cases. But I didn't want you to get the idea that contracting is a soft touch. It did you good to sweat for a while. You weren't very smart to tie yourselves up on that kind of a contract. And why in Hell didn't you go to the banks. They would have given you the money. That's what they're in business for. Well, anyway you saved the Great Western a lot of money. We didn't expect to get these stores completed for another six months. So long fellows, and keep your noses clean." What a character!

We threw a party to celebrate our success. It started out as a real genteel affair, but it sort of got out of hand toward the last. We had been under a strain for so long we just had to blow off steam. Hal ran into complications and had to withdraw for a while. Myrtle came to the party, and so did Janet, the insulation contractor's daughter. We told them Hal had passed out. Actually, the big lug spent the interval with Aggie the waitress. After a while the women cleared out and the party got down to some serious drinking. I went home early. These young fellows can take it, but I'm not so young any more. Besides, I have to conserve my strength. With this taste of success we have had—it's hard to tell what will come up next. Then there is always Hal to worry about. He's bound to get into trouble if he keeps playing around.

New ATTIC FAN TIMER by Paragon

HERE'S a new member of the Paragon family . . . the AF Series for timing attic and window fans.

Entirely new in design, this timer is offered in two time ranges, 0-10 hours and 0-20 hours, each fully adjustable to any position on the dial . . . a real convenience for the user.

Equipped with a quiet Telechron motor and an improved switch, the timer is rated for high capacity, and will handle a ½ HP motor. Beautifully finished drawn aluminum case, anodized, with dial and pointer protected by clear Plastacele.

Underwriter approved, all electric, no springs, mounts easily to Handy box or single gang switch box, or may be surface mounted with conduit connections into the bottom of the timer. The setting may be changed at will without harming the instrument. Timer motor runs only when timer is actually in operation.

AT ONLY $9.75 AN OUTSTANDING VALUE

Get your orders to your jobber—now and start planning installations early. Complete data sheet on request.

PARAGON ELECTRIC COMPANY
1636 Twelfth Street
TWO RIVERS, WISCONSIN

Paragon Two Rivers WISCONSIN
MANUFACTURERS OF ELECTRICAL EQUIPMENT SINCE 1906

NO RUN-IN TIME

On the NEW

Arlington SHAFT SEALS

Simply install and the job is done. Save half an hour on each seal replacement job. Installation is simple and easy even when the shaft is slotted, undercut, pitted or corroded.

Precision finished—not to thousandths but to *millionths* of an inch.

Available at better jobbers or write for full information on

The New

Arlington SHAFT SEAL

MODERN DESIGN PRODUCTS CO.
3944 W. LAKE ST. · CHICAGO 24, ILLINOIS

NEW and IMPROVED EQUIPMENT

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Auger Bit

A NEW Auger Bit set for fast, easy wood-boring is announced by Bruno Tools, Beverly Hills, California, manufacturer of a complete line of precision cutting tools for home and industrial use.

The Bruno Auger Bit Set consists of an 8¼" shank and a number of Bruno quick-change boring heads, packed in a rigid two-color plastic case. It comes in two sets. One set contains six boring heads, 5/8" to 1¼" by eights. The second set contains eleven boring heads covering a range from 5/8" to 1¼" by sixteenths. Both sets are available with straight shanks for use in bench drill, drill press or portable drill, or with square shanks for use in hand brace.

Even in the hardest woods Bruno requires no forward pressure in boring and turns easily with only finger-tip pressure. This is made possible by the extra long cutting edge of the boring head and by the specially designed lead screw which actually pulls the tool through the wood. There are no flutes to bind or clog. Bruno bores cleanly all the way with a minimum of effort and a maximum of accuracy.

Heads are made from high carbon tool steel, heat-treated to assure long life, and are easily sharpened. Their extra long cutting edge means faster, easier cutting action.

Dehydrators

THE Electrimatic Division of the Simoniz Company, Chicago, Illinois, announces a new line of strainers, non-refillable and refillable dehydrators. All strainers and dehydrators are provided with flare fittings accurately machined to insure leak-proof connections. These fittings are silver soldered to end caps of heavy gauge steel. The end caps are then sweated with tin solder to equally heavy steel tops. The inlet screen is a 60x60 monel metal, and the outlet filters are of porous bronze metal. Each dehydrator is pressure tested and specially inspected before packing. Steel flare nuts with copper sealing caps seal the dehydrator against breathing of moisture. Strainers are manufactured in a similar manner with porous metal discs used instead of wire mesh screens to trap dirt in the strainer. Non-refillable dehydrators are made in sizes from 4 cu. in. to 32 cu. in. Refillable types are made from 10 cu. in. to 32 cu. in. Strainers are 2" diameter with ¼" and ⅜" flare fittings.

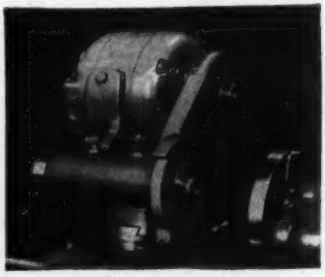
Grinder

A POWERFUL electric grinding attachment for use on lathes and other machine tools has been developed by the South Bend Lathe Works. Designed primarily for precision external grinding, it is equipped with a 4" x ½" grinding wheel which is driven by a constant speed continuous duty ¼ h.p. motor. This permits taking heavier sustained cuts than would be practical with a universal type motor of the same rated horse power.

The grinding wheel spindle runs on prelubricated sealed precision ball bearings which require no adjustment or additional lubrication. Effectively protected from abrasive grinding wheel dust, the sealed bearings will retain their precision indefinitely. Tension adjustment is provided for the V-belt which connects the motor with the grinding wheel spindle.

Spring stops for grinding straight and spiral fluted reamers and cutters, diamond dressers for truing the grinding wheel, and holding fixtures for the dressers can be furnished for use with this grinding attachment.

For more complete information, catalog, and prices of this grinding attachment, write to the South Bend Lathe Works, 220 E. Madison St., South Bend, Ind.



MOTOR-CAPACITOR NEEDS can be

JIFFY CHECKED

with this

SELECTOR

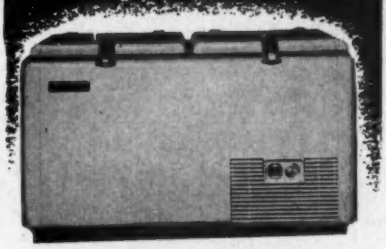
• It's available again—the Aerovox Motor-Capacitor Selector! Just clip in place of wornout capacitor. Flip switches until quickest start, within safe voltage reading, is obtained. Then read actual capacitance directly. Save time, trouble, money, headaches! • Available through your favorite supplier. • Or write us for data.

AEROVOX capacitors

FOR RADIO-ELECTRONIC AND INDUSTRIAL APPLICATIONS

AEROVOX CORP., NEW BEDFORD, MASS., U. S. A
Export: 13 E. 40th St., New York 16, N.Y. • Cable: 'ARLAB'
In Canada: AEROVOX CANADA LTD., Hamilton, Ont.

LOOMING BIG IN THE MODERN AMERICAN LIVING SCENE . . .



. . The BEN-HUR Farm & Home Freezer

Engineered and designed to bring the health-building benefits of fresh-frozen foods to the rank and file of better-living conscious Americans. Hundreds of thousands of new homes now planned and building are present prospects for a generous-size, dependable, quality-built BEN-HUR Farm and Home Freezer.

Service-wise dealers, anticipating increased customer good-will and confidence will feature and recommend the new "BEN-HUR" for these "Stand-Out" Quality Features.

★ ALL STEEL CONSTRUCTION
★ LIFETIME TESTED
★ ALL FOOD SURROUNDED BY COLD
★ A SIZE FOR EVERY FAMILY
★ THICK INSULATION (Hermetically Sealed)
★ MODERN, SMART DESIGN
★ ECONOMY-ENGINEERED

BEN-HUR MFG. CO.
Continuous Manufacturing Since 1911
634 E. Keefe Ave. Dept. RS Milwaukee 12, Wis.

BEN-HUR FARM & HOME FREEZERS

News of the Equipment Industry

F. J. HOOD TO BE SHOW CHAIRMAN

R KENNEDY HANSON, executive secretary of the Refrigeration Equipment Manufacturers Association, announced recently that the Association would hold its annual meeting April 9, 10 and 11 at the Edgewater Beach Hotel in Chicago.

At the same time, announcement was made of the selection of F. J. Hood, Ansul Chemical Company, as chairman of the 1948 All Industry Refrigeration and Air Conditioning Exposition which will be held next January in Cleveland, Ohio. J. A. Strachan, Weatherhead Co., and J. A. Marshall, Wolverine Tube Division, were named assistants to Mr. Hood.

F. J. HOOD

A meeting of the Board of Directors and Advisory Board members of REMA will meet the first day of the three-day session. The annual election of directors and officers will take place at this time. The annual meeting of the entire membership will be held the second day, and product section meetings the third day. The proposed program for April 10, the day of the membership meeting, is as follows:

10 A.M.—Annual report of the president, H. F. Spoehrer.

Treasurer's report, Guy J. Henry.

"Our Public Relations Program" (illustrated presentation), Theodore Sills, Sills, Inc.

Announcement of the 5th All-Industry Refrigeration and Air Conditioning Exposition, F. J. Hood.

12:30 P.M.—Luncheon.

"The Value and Use of Commercial Standards," F. W. Reynolds, Acting Chief, Division of Trade Standards, National Bureau of Standards.

2 P.M.—Afternoon session theme—Merchandising and Marketing.

"Utilizing a Market Survey," Burt Hotvedt, Blackhawk Mfg. Co.

Paper—"What About Sales Helps," speaker to be announced later.

"How to Plan Sales Meetings," W. W. Kemphert, Worthington Pump & Machinery Corp.

Paper—"Let's Talk About Exports," speaker to be announced later.

Panel Discussion Period.

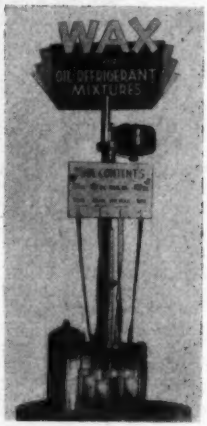
Announcement of the Election of 1947-1948 officers.

Remark from President-Elect.

S S S

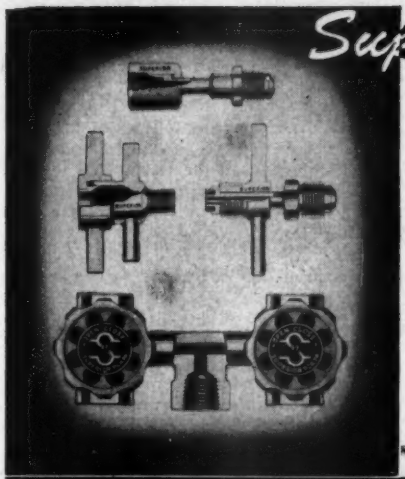
WAX IN OIL-REFRIGERANT MIXTURES DEMONSTRATED

VISITORS to Ansul Chemical Company's booth at the All-Industry Air Conditioning & Refrigeration Exposition at Cleveland last October manifested a great deal of interest in the display prepared by the Ansul research laboratory showing what wax in oil-refrigerant mixtures actually looks like. It is a subject which service engineers realize is important and one in which they are vitally concerned.



The display involved a thermos jar containing a rack holding sealed test tubes in which oil-refrigerant mixtures were placed, a low temperature thermometer and a stirring device. A light increased the visibility of the wax.

By mixing oil and refrigerant in sealed tubes and then cooling these mixtures to a low temperature of -50 C., wax was seen to separate from the mixture. It was the first public showing of this all important hidden problem in refrigeration.



Superior SERVICE TOOLS

GAUGE MANIFOLDS

Neat, compact, convenient—handwheels out in front to save valuable toolbox space. Hex service connections tapped F.P.T., so elbows or straight fittings of your own choice may be installed.

QUICK-COUPLERS

Exactly what the name implies—handy little swivel connectors for "quick-coupling" charging lines, gauge lines, vacuum lines, pressure lines, etc. to refrigeration cylinder valves, gauge sets, compressor service valves, evaporators, condensers and other equipment, *without the use of a wrench.*

Made in three styles—(1) For charging and gauge lines for field or shop service, or factory production equipment; (2) test hook-ups for evaporators, condensers, controls, etc.; (3) for testing equipment where only a tubing connection is provided for attaching.

If you haven't a copy of Catalog 82, Request one today

SUPERIOR VALVE & FITTINGS COMPANY
PITTSBURGH 26, PENNSYLVANIA
OFFICES IN PRINCIPAL CITIES • STOCKS CHICAGO (6) • LOS ANGELES (5) • JOBBERS EVERYWHERE

Get to the best of thirst!

Smooth, easy, trouble-free action of the dial-type bubbler controls is just **one** of the OASIS features that assure longer-lasting, low-maintenance service in every type of installation. Offering both standard and commercial sizes for every need—with bubblers, glass fillers, or both—OASIS coolers provide full cooling and storage capacities in highly compact units of outstanding beauty and ruggedness. Every OASIS detail reflects EBCO's 20 years of leadership in the designing and building of electric water coolers. Write for proof!

OASIS
ELECTRIC WATER COOLERS

The EBCO MANUFACTURING COMPANY
[illegible]

Among the numerous technical bulletins distributed by Ansul was one entitled, "The Separation of Wax from Oil-Refrigerant Mixtures." The bulletin is a complete treatise on this subject and is available upon request.

AIRSERCO ANNOUNCES NEW NAME AND NEW TESTER PRODUCT

AIRSERCO Manufacturing Company, Inc. is the new name for the refrigeration service instrument manufacturer formerly known as Aircraft Service Company.

The new corporation, formed as of January 1, 1947, will continue its factory and general offices at 435 Melwood St., Pittsburgh, Pa.

Officers in the new corporation are: E. C. Williams, president; Wayne R. Jamison, vice-president and technical director; H. M. Williams, secretary and treasurer; H. V. Davis, director.

Production plans for 1947 are to be three times the firm's 1946 output, according to Mr. Williams, the president.

Leading the new increased production is the firm's new TXV Tester, announced for the first time in this issue of THE REFRIGERATION SERVICE ENGINEER. This new testing instrument, according to Mr. Jamison, Airserco's technical director, is the first production of its kind offered to the industry. The TXV Tester will enable the shop and service man to accurately test and set the super-heat requirements for all types of thermostatic expansion valves. Providing "Short Cuts for the Service Engineer," (Airserco's slogan), the TXV Tester also accurately performs the following:

Indicates by gauge readings the actual super-heat setting of the valve being tested.

Examines the true performance of the thermo valve by taking it in and out of its operating range.

Enables the service engineer to quickly set any thermo valve for any refrigerant.

Determines holding adjustment and condition of the power element.

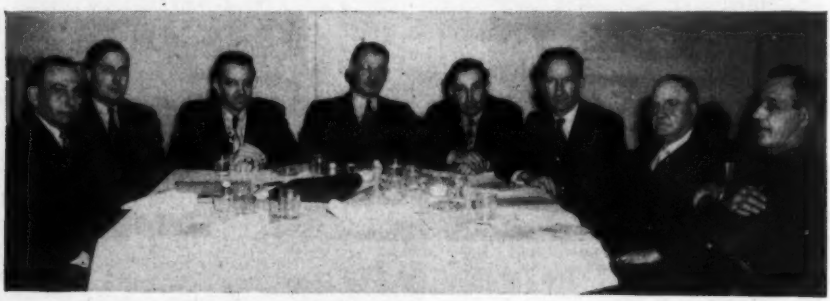
The TXV Tester, to be distributed through jobber outlets along with other products in the Airserco line, will be available for immediate shipment, Jamison also announced.

Williams also announced the appointment of George F. Ullum as assistant to the president.

JUDITH CAROL GOLDBERG

THE latest and fourth addition to the Herman Goldberg family is Judith Carol, born Feb. 28, weighing 8 pounds 10 ounces, bringing the family to a perfect balance of two boys and two girls.

Mr. Goldberg is owner of the Herman Goldberg Co., manufacturer's representative in the midwest area.



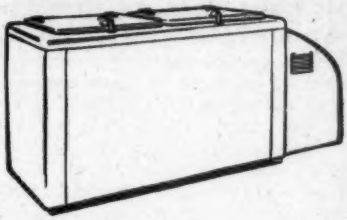
The newly elected Board of Directors of the Twin Cities Refrigeration Contractor's Association met at the Club Criterion in Saint Paul on Wednesday evening, February 12, to discuss plans for the year.

As a step toward increasing benefits of membership tentative plans call for future employment of an executive secretary and establishment of an association office. The Twin Cities Association is affiliated with the NARC. Twenty-two firms having about two hundred and twenty-five employes are now members of the Twin Cities Association. The directors believe that this membership can be doubled if proper steps are taken to acquaint non-member refrigeration contractors in Minneapolis and St. Paul with the benefits that can be derived from membership in the association.

Directors shown on the above picture are from left to right: Max F. Hoemke, director; D. M. Halverson, Sergeant-at-Arms; A. M. Palen, President; J. C. Ehlers, Vice-President; D. E. Frank, Director; T. H. Ingersoll, Secretary; J. P. Marchal, Director; Joe Parupsky, Treasurer.

SANITARY FREEZER CABINETS

The Finest Cabinet For Your Best Condensing Equipment



12.5 Cubic Foot Models Now Available Complete, less Condensing Unit

Attractively modern in style, heavily built with steel welded frame, rich in many unusual and exclusive quality construction features, SANITARY Freezer Cabinets are now in limited production for shipment on a 30- to 60-day basis. Each cabinet is complete with freezer plates, cold control and "Freon-12" expansion valve requiring merely installation of your own condensing unit. Typical of SANITARY design and engineering, every detail in these Freezer Cabinets is aimed at long service life, high efficiency in food freezing and storage—at lowest operating costs.

PLACE YOUR ORDER for these "top quality" SANITARY Freezer Cabinets TODAY.

SANITARY REFRIGERATOR CO.
Manufacturer
Fond du Lac, Wisconsin

Ice Refrigerators For More Than 40 Years
Quickfreez Farm Locker Plants Since 1939

STOP

TERMINAL LEAKS! COMPLETE KIT.
(3 Terminals)
$5.50

PAT. PENDING

Lower Prices in Quantity

Please Mention Jobber's Name

Coldspot Couplings and Dome Gaskets. Immediate Delivery. 25 cents each in lots of 10

WAGNER REPLACEMENT TERMINALS

A research development designed to repair terminal leaks on sealed units, instantly and permanently on the job—

IN 5 MINUTES

No special tools or equipment required. Now available for Crosley F 12. Soon available for Frigidaire, Westinghouse, Norge, Kelvinator, and TECUMSEH (Chieftain) UNITS.

Territories Open to Manufacturers Representatives

WAGNER PRODUCTS CO.
2127 East 35th St., Brooklyn 10, N. Y.

Firm .....

Address .....

Jobber .....

Send Check or Money Order
We Will Ship Prepaid

No. of Complete Kits..... No. of Couplings.....

No. of Dome Gaskets..... ☐ C.O.D. ☐ Pre-Paid

GENERAL ELECTRIC INAUGURATES ENGINEERS TRAINING SCHOOL

TWO training schools, one offering courses in air conditioning and one covering commercial refrigeration, have been inaugurated by the General Electric Company's Air Conditioning Department in Bloomfield to bring engineers of the Company's distributors up-to-date on advanced refrigeration and air conditioning techniques through intensive three week courses. The schools are designed to serve not only as a brush-up course for the more experienced field engineers, but also as a background to practical work for the younger engineers in the distributor organization.

In class rooms equipped with a wide variety of the most modern types of equipment —condensing units, water chillers, coils, air conditioners for remote installations, and several types of self-contained units—the students put into practice under actual working conditions the theory covered in the class study.

Both the air conditioning and the refrigeration courses cover fundamentals, general orientation and review of equipment.

LOCKER INSTITUTE TO HANDLE EXHIBITS AT NEXT CONVENTION

THE Frozen Food Locker Institute, formerly the Frozen Food Locker Manufacturers & Suppliers Association, will be in charge of exhibits at the National Locker Convention to be held at the Municipal Auditorium in Kansas City, Missouri, next September 22-25, in accordance with an agreement just reached between the National Frozen Food Locker Association and the Frozen Food Locker Institute.

The convention and exhibits will be held in the Municipal Auditorium in Kansas City, and upwards of two hundred firms are expected to exhibit during the four-day convention. Many advance inquiries have already been received, and with improved delivery conditions in prospect for next fall, a large exhibitor list is anticipated.

Manufacturers of all types of locker equipment and farm and home storage units, food brokers, and others will be invited to participate.

Details of the exhibits and hotel reservations for convention exhibitors will be handled through the office of the Frozen

Members of the Refrigeration Condensing Unit Manufacturers Association, a sectional group of R.E.M.A., gathered at a meeting at the Carolina Hotel in Pinehurst, Feb. 5-9, for a discussion of commercial standards which guarantee to the public that machines measure up to the government standards, and to confer on the problem of increasing production to meet the current unprecedented demand for units.

L. to R. (front row): H. J. Hedrick, Mills Industries, Inc., Chicago, Ill.; W. J. Aulsebrook, Servel Inc., Evansville, Ind.; R. L. Sears, Lynch Manufacturing Corp., Toledo, O.; J. C. Miller, Lehigh Manufacturing Co., Lancaster, Pa.; (back row): R. Kennedy Hanson, Executive Secretary, R.E.M.A., Pittsburgh, Pa.; J. W. Thomas, Brunner Manufacturing Co., Utica, N. Y.; H. F. Hildreth, Westinghouse Electric Corp., Springfield, Mass.; George Kingston, Kelvinator Div. Nash-Kelvinator Corp., Detroit, Mich.

THE *Premier* SELF ALIGNING VALVE GRINDING KIT

the ideal

TOOL FOR THE BUSY SERVICE-REPAIR SHOP

Many refrigeration service shops are finding "The Premier" kit answers their needs for valve seat reconditioning both in the shop and on the job.

"The Premier" kit is more than just an ordinary resurfacing tool—it provides the mechanic with a complete set of dressing and lapping wheels for valve seats from ½" to 1¼" diameter—designed to assure easy, accurate operation for all seats using disc valves either recessed or flush and for many designed flush seats such as Frigidaire models K, N, S, E; and Universal model B, valve plates and pistons.

Speedy—a pitted or corroded valve seat can be ground, finished, and tested in a few minutes.

Write for descriptive circular and prices or see your Refrigeration Equipment Wholesaler

Packed in a hinged and fitted felt lined case to hold each piece in place. Complete instructions are enclosed in each kit.

THE PREMIER COMPANY
891 Park Ave. **Baltimore 1, Md.**

RAPID'S Improved Design
Means BETTER Dehydrator Performance

- *ONE PIECE NON-COLLAPSIBLE SHELL*
- *ENTIRE SHELL FILLED WITH SILICA GEL*
- *SMALL JOINT AREAS—SEALED WITH LEAD GASKETS*
- *LARGE SCREEN AREA PERMITS FULL FLOW*
- *BOTH SCREENS REMOVABLE— ALLOWS THOROUGH CLEANING*

FINE PRODUCTS COMPANY

185 N. WABASH AVE. ★ CHICAGO 1, ILLINOIS

Food Locker Institute, 656 Insurance Building, Omaha, Nebraska, according to R. R. Farquhar, Executive Director of the Institute.

AIRO OUTGROWS QUARTERS

DO YOU want the answer to the question, "How's the refrigeration business"? Airo Supply Co., Inc., Chicago, answers the question by leasing another building which will be used exclusively by the purchasing, inventory control, and expediting departments. This growth is a sure indication of the expansion in the refrigeration business and Airo is making plans accordingly. This expansion will enable the purchasing department to do a better job of searching out the kind of merchandise that offers money-making opportunities for the service field, and for handling merchandise on a prompt schedule.

A portion of the new space will be used for stocking and displaying some of the new and more bulky merchandise that Airo is now handling. The space formerly occupied by the purchasing department will be used by the new and expanded advertising and sales promotion department. Airo's plans for catalog improvement are far-reaching.

BICKEL TO MANAGE NELSON SUPPLY BRANCHES

N. O. NELSON CO. announces the appointment of T. C. (Joe) Bickel as manager of their refrigeration supply branches, with headquarters in St. Louis, Mo.

ROCHE & HULL NEW LOCATION

ROCHE & HULL, INC., Baltimore, Md., are now located in their new quarters at 1107-19 Maryland Avenue. Their new quarters has a total frontage of 88 feet, divided basically in two sections, each 44 feet wide. One section of this building is one story high and 97 feet deep. The other is two stories high and 150 feet deep. The second story of the building is being used for offices and a meeting room which will seat approximately 100 people. Adjoining the meeting room is a kitchen from which refreshments can be served when the occasion requires it. The balance of the second floor is devoted to warehouse and bulk storage.

Included in the first floor section is a garage for customer parking, separated from the warehouse space by a loading platform. An elevator connects the two floors. The other first floor section of the building is devoted to a stock room and a counter space 44 feet long.

In the announcement made by George J. Roche, President of the company, he states, "It is our belief that with these facilities we will be in a much better position to serve the refrigeration, air conditioning and heating trade than we have ever been before."

BERT HOLYOAKE TO MANAGE CALIFORNIA JOBBERS STORE

P. B. (Bert) HOLYOAKE was recently appointed the new Manager of the San Francisco Store of the California Refrigerator Company. Mr. Holyoake had been in charge of the sales department for the Company during the past five years. Prior to his affiliation with the California Refrigerator Company, Mr. Holyoake served as agency and Branch Sales Manager for the Burroughs Company in Sacramento and San Francisco, where he became well known in business circles throughout this area.

P. B. HOLYOAKE

Lem Branson, former store manager, has accepted a new position as General Sales Manager for the Western Refrigeration Company of Oakland. Lem has made a good many friends throughout the refrigeration field during the past 14 years.

Announcement was also made of the appointment of "Dick" Elrod and "Chuck" Hall as Assistant Managers of the San Francisco and Oakland Stores, respectively.

TENNEY DEMONSTRATES GLASS EVAPORATOR AT MEETINGS

ENGINEERS of Tenney Engineering Inc., 26 Avenue B, Newark 4, N. J., are demonstrating their glass evaporator before interested groups in the principal cities of the east and midwest.

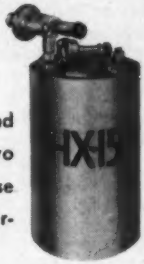
This evaporator enables a large group to see clearly how variations in conditions af-

MINIMUM PRESSURE DROP with HEAT-X CAST ALUMINUM HEAT EXCHANGERS

Shown are two models of Heat Exchangers —various sizes available. Both liquid and suction are copper tube. Ideal for use as water cooled capacity boosters on air cooled units. No internal joints—no by-pass.

MORE BTU's PER WATT with HEAT-X CAST ALUMINUM LIQUID COOLERS

Here is one of Heat-X Coolers you can select from a range of sizes.



No freeze-up damage and no short cycling are two outstanding features. These Coolers combine top performance and low cost.

WRITE AT ONCE FOR HEAT-X ENGINEERING SPECIFICATIONS AND CAPACITY TABLES

Orders Promptly Shipped

THE HEAT-X-CHANGER CO., INC.

415 Lexington Avenue, New York 17, N. Y. Brewster, New York

LEAKY TERMINALS

ON ALL

SEALED CROSLEY F-12 UNITS

EASILY REPAIRED IN A FEW MINUTES WITHOUT OPENING THE COMPRESSOR

SET OF THREE TERMINALS (PART NO. 1020).....$6.75

INSTALLATION TOOL (PART NO. 23051).....$1.65

★ ★ ★

FLOAT REPLACEMENTS

Part No. 2000—Westinghouse (4 hole mounting plate).
Part No. 2010—Westinghouse (3 hole mounting plate).
Part No. 2020—Gibson.
Part No. 2030—General Electric (monitor top models DR-1 and DR-2).
Part No. 2040—For general replacement (with undrilled mounting plate).

These parts are used to replace defective high side floats on household units. They have regular charging set connection, cap tube setup, internal strainer and exact mounting plate. Solid brass construction—neat appearance. Quickly and easily installed. Each.....$6.75

★ ★ ★

IMMEDIATE DELIVERY — MONEY BACK GUARANTEE

Order Through Your Supply Wholesaler or Write Direct.
Write for Bulletin No. 14 Listing Other Sealed Unit Parts.

LOOK IN THE NEXT MONTH'S ISSUE FOR OTHER SEALED UNIT PARTS

SEALED UNIT PARTS CO.

3097 Third Ave. New York 56, N. Y.

fect the flow of refrigerant. The unit is set up with meters, expansion valves, and auxiliary apparatus to indicate and control conditions under examination. The flow of refrigerant can be reversed at will to show top or bottom feed.

The itinerary of Tenney engineers includes showings before several RSES groups and before audiences at the show rooms of a number of refrigeration wholesalers.

Tenney engineers state that the demonstration is at present available to meetings of RSES and to jobbers interested in group meetings in the states of Indiana, Illinois and Ohio.

Tenney engineers will proceed from Cleveland with the Nash-Kelvinator Caravan through Ohio and Pennsylvania to Buffalo, covering all principal cities enroute to New York City. Members of RSES interested in having this demonstration conducted before member meetings are advised to contact Tenney Engineering, Inc., promptly. Refrigeration jobbers located in cities along the route given above who are interested in arranging demonstrations before interested groups should also communicate with Tenney concerning available dates.

SUPERIOR PROMOTES ROBSON

F. N. (Neil) ROBSON has recently been promoted to the position of assistant sales manager by Superior Valve & Fittings Co. Mr. Robson became associated

F. NEIL ROBSON

with Superior early in 1942 and was employed in the Pittsburgh sales office until February 1944, at which time he was made assistant to the eastern district office manager, with headquarters in New York City. Having joined the U. S. Navy in early 1945, he received his honorable discharge in the spring of 1946.

Since his return to Superior and until this recent appointment his duties had been to expedite and control the flow of incoming material into the plant.

NEW FREEZER MODEL

AN 18 cu. ft. Ben-Hur freezer is soon to be on the market, it was revealed recently by A. B. Bechaud, sales manager of the Ben-Hur Co. The new freezer which will add a third size to the company's variety of freezing units, is scheduled for production in April or May, according to George Caesar, production manager. It will be similar to the 12.5 cu. ft. Ben-Hur and, like it, will be produced in both standard and de luxe models, the latter having a stainless steel inner liner.

Both of the new models will contain separate freezing and storage compartments and two lids. Units will be of ⅓ h.p. According to present estimates, the standard 18 cu. ft. Ben-Hur will retail at around $550. The de luxe model will be slightly more. The company will continue to produce their 12.5 cu. ft. and their 6 cu. ft. freezers.

WEATHERHEAD PERSONNEL

FROM George Hufferd, Vice President in charge of Engineering at The Weatherhead Company, Cleveland 8, Ohio, comes the announcement that John Baldwin

JOHN BALDWIN

B. R. TEREE

has been appointed Assistant Chief Engineer with direct supervision of the project engineering and drafting and design groups. This work covers the design of new automotive, industrial, refrigeration, and aircraft products, redesign of old products and establishment of engineering specifica-

CARRENE NO. 1

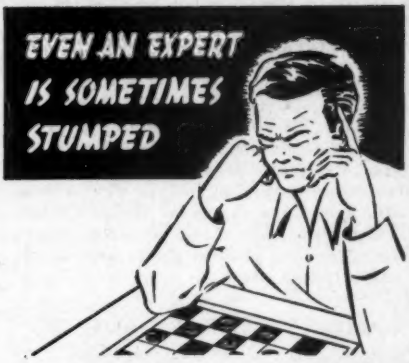
- Cut your moisture problems.
- No other refrigerant will operate satisfactorily in a Grunow refrigerator (note—Factory Bulletin No. 177).
- Write for Service Manual and name of nearest Distributor.

GRUNOW
AUTHORIZED SERVICE, INC.
4515 W. Fullerton Ave., Chicago, Illinois

REFRIGERATION
CYRUS SHANK COMPANY
PRODUCTS

Ammonia Shut-Off and Line Valves
Gauge Sets
Driers Strainers
Water Regulators
Stocked by Leading Jobbers Everywhere

CYRUS SHANK CO.
627 W. Jackson Blvd., Dept. A, Chicago 6, Ill.



Like the checker-playing expert, the refrigeration serviceman — old-timer or youngster — sometimes finds himself up against a problem, the answer to which he either cannot remember or never has learned. Yes, servicemen are often stumped—and that's why so many of them turn to Utilities Engineering Institute for the training they know will give them the thorough brushing-up they want.

How highly refrigeration concerns value U.E.I. training is proved by the PHILCO CO. which has again called on the Institute to train members of its service organization.

PHILCO SERVICE

U.E.I. BALANCED TRAINING

A high-quality method of training that combines practical home study with technical shop practice. It's the course which men in refrigeration are today putting to profitable use. How about you? When you find yourself stumped, it's time to arm yourself with the right answers.

Write today for FREE FACTS about U.E.I.'s helpful, thoroughgoing training program. Approved for Veterans' Training.

UTILITIES Engineering Institute
Dept. 45, 1314 W. Belden Ave., Chicago 14, Ill.

Please give me more information about Refrigeration and Air Conditioning Training.

Name .....

Address .....

City..... State.....

tions. Mr. Baldwin formerly was Automotive Project Engineer at Weatherhead.

Also announced was the appointment of B. R. Teree to the position of Laboratory Director. In his new position Mr. Teree, formerly Project Engineer in charge of Aircraft Development, will have supervision over the large Weatherhead engineering laboratories. Before joining Weatherhead, Mr. Teree was in charge of all Curtiss-Wright experimental and production design of hydraulics, landing gears, tail wheels, and arresting gears.

CARLOS HATCHER NAMED TO U. C. ADVERTISING POST

CARLOS M. HATCHER has been appointed advertising and sales promotion manager of Universal Cooler Division International Detrola Corporation, Marion, Ohio, according to an announcement by T. S. Pendergast, director of sales.

C. M. HATCHER

Mr. Hatcher was formerly advertising manager of the Pontiac News, Pontiac, Mich., and had previously served several other newspapers in a similar capacity. In the new post he will handle all Universal Cooler advertising and sales promotion, publicity, exhibits and the firm's house organ, "The Cooler News."

FRIGIDAIRE PERSONNEL

THREE major changes among executive sales personnel of Frigidaire Division of General Motors Corporation have been announced at the Company's Dayton offices by P. M. Bratten, General Sales Manager.

P. H. Brennan, Commercial Sales Manager, has been appointed Sales Manager of the Direct Factory Sales Division; W. F. Switzer, Manager of Marketing Research, has been appointed Manager of Commercial Sales, replacing Mr. Brennan, and L. W. Smith, Assistant Marketing Research Manager, has been appointed Marketing Research Manager, succeeding Mr. Switzer.

"Because of the rapidly growing demand for air conditioning and refrigeration products among railroads, bus manufacturers, railroad car builders and other similar concerns," Mr. Bratten explained, "our Manager of Direct Factory Sales, L. McCutcheon, has created the new position of Sales Manager in his department. Mr. Brennan was selected for this position because of his 21 years experience in the commercial refrigeration and air conditioning phases of our business."

BRUNSWICK-BALKE PROMOTES F. H. WALSWORTH

FRANK H. WALSWORTH has assumed the duties of Assistant Refrigeration Engineer in charge of design, development and engineering for The Brunswick Balke-Collender Company in Muskegon Michigan, according to an announcement by G. D. Whiting, Chief Engineer. Mr. Walsworth takes over the responsibilities formerly held by M. P. Penn who has resigned.

F. H. WALSWORTH

Formerly Refrigeration Service Manager, a position he had held for approximately a year before his promotion, Mr. Walsworth has been an employee of Brunswick for 16 years. He began his employment in the radio service department and has worked in various engineering functions since 1930. With the advent of the manufacture of refrigeration units by Brunswick, he was transferred to testing and development of these products.

Mr. Walsworth has also done work in industrial sound and in the electronics of resistant heat units which were used in the manufacture of aircraft parts.

He is an associate member of the American Society of Refrigeration Engineers, Detroit, Michigan chapter.

SPORLAN VALVE NEW OFFICES

THE Sporlan Valve Company of St. Louis announces the opening of new sales offices in Dallas, Texas and Philadelphia, Pennsylvania. The new southwestern division office at Dallas will be supervised by P. J. McCarty. His territory will com-

CABINET DRINKING WATER COOLERS

Glass filler or bubbler coolers are available with capacities up to 25 gallons per hour. Cabinet of heavy steel welded construction with white baked enamel surface. Also available now — normal and high suction pressure water coolers for commercial use.

Write for latest data.

DAY & NIGHT

REFRIGERATION DIVISION

DAY & NIGHT MFG. CO.

One of the Dresser Industries

MONROVIA, CALIFORNIA

SOLD THROUGH REFRIGERATION WHOLESALERS AND DEALERS

Air Conditioning

LOW SIDES HIGH SIDES

We are now delivering both high and low side equipment from 5 to 25 ton capacity.

Our schedules make it possible to enter additional orders for delivery prior to May 15th.

Consult us when designing central air conditioning systems. We can offer suitable equipment to meet your requirements.

Let's Get Salesminded—NOW!

Headquarters for Major Refrigeration Equipment

THERMAL COMPANY INC.

St. Paul 4, Minn. 2410 University Ave.
Milwaukee 3, Wisc. 749 No. 7th St.
Des Moines 9, Iowa 106 Eleventh St.
Cedar Rapids, Iowa 503 Fourth Ave. S.E.
Great Falls, Mont. 306 First Ave. South

BETTER WORK

from Quickee-clean hands!

Your hands are the most valuable tools of all! Grime, grease and dirt cut down their efficiency—more than you know. Cracked skin, chapping make them stiff and clumsy. For more, *better* work, take care of your hands!

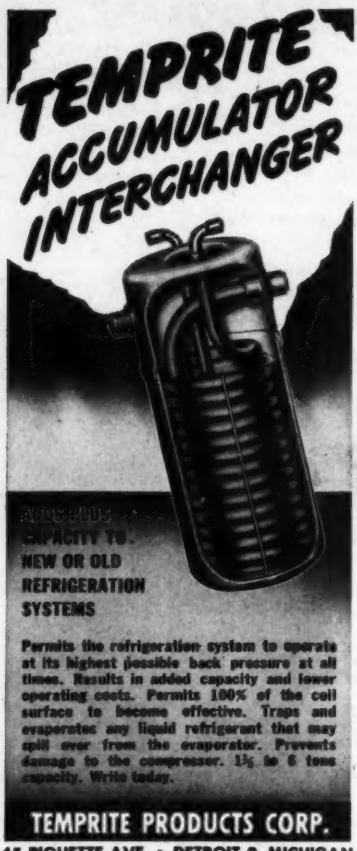
New, different QUICKEE removes grime...grease...paint—in 17 seconds flat! Contains LANOLIN—good for the skin, prevents chapping. Uses NO WATER. Saves time, trouble and money.

TRY QUICKEE on the job—at home!

QUICKEE WATERLESS HAND CLEANER

Send for FREE SAMPLE

TUDOR CHEMICAL SPECIALTIES, INC.
Tudor Bldg., New York 53, N.Y.


TEMPRITE
ACCUMULATOR
INTERCHANGER
CAPACITY TO
NEW OR OLD
REFRIGERATION
SYSTEMS
Permits the refrigeration system to operate at its highest possible back pressure at all times. Results in added capacity and lower operating costs. Permits 100% of the coil surface to become effective. Traps and evaporates any liquid refrigerant that may spill over from the evaporator. Prevents damage to the compressor. 1½ to 6 tons capacity. Write today.
TEMPRITE PRODUCTS CORP.
45 PIQUETTE AVE. • DETROIT 2, MICHIGAN

HERMETIC
REPAIR SERVICE

Also Conventional Compressors

●

JOHNSON ELECTRIC
1200 N. 8th Burlington, Ia.

prise the states of Arkansas, Oklahoma, Texas and parts of Kansas and Louisiana. T. H. Silary, with headquarters in Philadelphia, will cover Eastern Pennsylvania, Southern New Jersey, Maryland, Washington, D.C. and Virginia.

J. T. Barry has been brought back to St. Louis after spending three years in the Eastern district office at New York City. His new territory includes principal Midwestern states around St. Louis. He is being replaced by A. L. Javes, a new man with Sporlan, who will cover the New England States. Sales personnel in the New York office, which is under the management of C. C. Grote, also includes W. A. Reichenbach.

The Chicago and Cincinnati offices are under the supervision of E. C. Fockler and J. E. Dannels respectively. The Cincinnati territory will be comprised of the states of Ohio, Michigan, West Virginia and portions of Indiana, Kentucky, Western Pennsylvania and Western New York. The Chicago territory includes Wisconsin, Minnesota, Northern Illinois and Northern Indiana.

S S S

NEW CATALOGS AND BULLETINS

Tenney Engineering, Inc. 26 Avenue B, Newark 5, N.J., states that a new edition of the cooling units catalog, designated as Catalog CD 48, is being issued to distributors and customers. They state that "prices have been revised in accordance with the established company policy of maintaining highest quality at a fair price."

Included in the 20 pages of this catalog are illustrations and descriptions of the Tenney products for use in the refrigeration and air conditioning field. Especially valuable to users of finned coils is the chart for selecting the size of coils for a specific cooling load and a simplified method for determining the price of such a coil. Other data useful to engineers and refrigeration service men are also included.

Products illustrated and described include Tenney Unit Coolers, Kwik-Freeze Ice Makers, Tenney Coil and Pan Combinations, Tenney Wall Mounted Panel Units. Bare Tube Coils, Tenney Bunker Type Coils, Coils for Display Cases, Gravity Coils, Beer Cooling Coils and others.

The Harry Alter Co. jobbers and wholesalers of refrigeration and air conditioning equipment are pleased to announce that their new catalog No. 148 for Spring of 1947

HERVEEN the Replacement Refrigerant

Servicemen—Herveen is the IDEAL REPLACEMENT GAS for Meter-Misers. When your Frigidaire Meter-Miser customers need service on their unit, don't turn them down with the statement "the refrigerant is not available." We can deliver

HERVEEN the IDEAL

REPLACEMENT REFRIGERANT

Many service companies are using this refrigerant for charging Meter-Misers in their localities.

★ Meter-Miser calls are routine with a supply of HERVEEN.

★ Installing HERVEEN does not involve more than average care.

For deliveries, see your local jobber or write to

Conservative Gas Corporation, Modern Gas Division

MANUFACTURERS AND REFINERS

1084 Bedford Ave. Brooklyn 5, New York

Says GASKET JOE

YOU WON'T GET DINNERS AT THE RITZ LEAVING DOOR GASKETS ON THE FRITZ

5-A

JARROW PRODUCTS

420 N. LA SALLE ST., CHICAGO 10, ILLINOIS

IT'S THE TRAINING THAT COUNTS!

Practical Shop Training

In

AIR CONDITIONING

DOMESTIC—COMMERCIAL

INDUSTRIAL REFRIGERATION

Service, Maintenance and Installation

COMMERCIAL TRADES INSTITUTE

200 South 20th Street

Department A

Birmingham, Alabama

Veterans Inquire About G. I. Training

Train in Birmingham, *"The Magic City"*

has just been released and is in the mail. This new catalog has many new items added to it, along with the latest price revisions on all lines. If you haven't received your copy yet, write The Harry Alter Co., 1728 S. Michigan Ave., Chicago 16, Illinois.

THE WEATHERHEAD COMPANY of Cleveland, Ohio, have just released an interesting booklet with an entirely new slant entitled "Prospecting For Perfection." It deals with the scientific research and engineering back of this company's operation.

Emphasis is placed upon the importance of engineering, research and development engineering in the success of this company, which is now the world's largest manufacturer of tube fittings and flexible hose assemblies as well as products for the Liquefied Petroleum Gas industry.

Gene P. Robers, Sales Promotion Manager, said in commenting on the booklet: "In this booklet we have tried to convey to the many users of our products, the amount of care and study which goes into the design, testing, and product development of all Weatherhead parts by our designers, engineers, experimental machine shop and laboratories."

Many plant operations are illustrated including 18 types of products and a chart showing their use by some 15 various key industries.

The booklet is 11x8½ inches, 32 pages in two colors, and carries 85 illustrations. Copies may be had upon request by writing to the Sales Promotion Department, The Weatherhead Company, 300 East 131st Street, Cleveland 8, Ohio.

AMERICAN AIR FILTER CO., INC., manufacturers of air filtration and dust control equipment, discusses various types of industrial dust problems and typical applications of AAF air filters to such problems in a new 23-page illustrated booklet.

Included in this booklet are a chart of size and characteristics of air-borne solids and sections dealing with atmospheric dust, and filtered air for: industrial air conditioning, industrial ventilation, drying operations, product finishing, control of bacteria and mold spores, cooling electrical equipment, engines and compressors and miscellaneous industrial applications.

Issued free upon request by American Air Filter Co., 215 Central Ave., Louisville 8, Ky.

EXPERT COMPRESSOR REBUILDING

A Compressor Rebuilding and Exchange Service Offering Prompt Delivery and a 90 Day Guarantee.

Reasonable Prices

For Quotations, Phone LAKeview 2480 or Write

WE DO NOT REPAIR HERMETIC UNITS

BARKSDALE COMPRESSOR SERVICE

3649 N. Ashland Ave. Chicago 13, Ill.

NEW NO. 47 CATALOG
NOW OFF THE PRESS

WRITE FOR COPY ON YOUR LETTERHEAD TODAY

REFRIGERATION — PARTS
AIR CONDITIONING — AND
HEATING — SUPPLIES

THE SUPPLY HOUSE THAT SERVICE BUILT

SERVICE PARTS COMPANY

2511 LAKE STREET, MELROSE PARK, ILLINOIS

C IS FOR COURTESY
always first in our mind

H IS FOR HELPFULNESS
of the finest kind

A IS FOR ATTENTION
which your orders receive

S IS FOR SERVICE
you'll find hard to believe

E IS FOR EFFORT
to serve you better

Send us your orders and we'll fill them to the letter.

CHASE
REFRIGERATION SUPPLY CO.
546 W. 119th Street, Chicago 28, Ill.

Ask Your Jobber for
HASCOBILT
Parts
SUCTION
and
DISCHARGE
VALVE, DISC, REEDS
and SPRINGS
for Conventional and Hermetic Type Compressors

If your jobber can't supply you, send for illustrated catalog and price list.

HASCO, INC.
GREENSBORO, N. C.

ACE ICE CREAM CABINET CORPORATION
ACE
NEW YORK 60, N.Y.

MANUFACTURERS OF

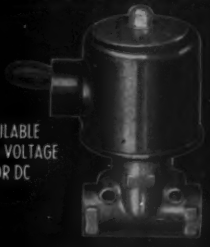
Ice Cream Cabinets

Farm and Home Freezers

Frozen Food Display Cabinets

Soda Fountains and Bob Tails

New **K-20 VALVE**
for REFRIGERANTS
also Gas, Oil, Air and Water



AVAILABLE
ANY VOLTAGE
AC OR DC

TWO WIRE
CURRENT
FAILURE

Wide range of applications. Silent operation. Packless construction. Body high-grade brass forging, all internal parts bronze or stainless steel.

GENERAL CONTROLS
801 ALLEN AVENUE GLENDALE 1, CALIF.
Branch Offices and Distributors in Principal Cities
29-4

WHOLESALE REFRIGERATION REPAIR CO.

Specialists in rebuilding Cold Controls, Thermostatic and Automatic Expansion Valves, Compressors, Valve Plates, Water-cooled Receivers, Floats, Condensers, Fin Coils, Motors, Dehydrators, and Water Valves.

Two days service if desired. 90 day guarantee on all work.
Special attention given to mail orders.

WHOLESALE REFRIGERATION REPAIR COMPANY
4025 Armitage Ave. **Chicago 39, Ill.**
Phone: CAPitol 8454

An able staff of men to serve you—whether it be a large or small order.
AIRCO'S one-day service is our assurance to you that the combined efforts of our personnel work in unison to give you what you need when you need it.

Airco Refrigeration PARTS REG.

COLDSPOT REPAIR SERVICE

COMPLETE UNIT OR COMPRESSOR
OPEN TYPE ONLY
Work Guaranteed

Write for Price
SUPREME MFG. COMPANY
2851 East Court St.
FLINT 7, MICHIGAN

REPAIR SERVICE

One year guarantee
Cold Controls • Pressure Switches
Expansion Valves
Look and Work Like New Controls
Original Factory Specifications

UTILITY THERMOSTAT CO.
4011 Halldale Ave **Los Angeles 37, Calif.**

BTI Certification

Government-Approved For Veteran Training Under The G.I. Bill

REFRIGERATION-AIR CONDITIONING GRADUATES

TRAINED TO SERVE THE INDUSTRY

Let us help you solve your employment problem. Our graduates are available for servicing, installation, sales and junior engineering work. We welcome your inquiry, and are always glad to lend aid on individual problems.

BOSTON TECHNICAL INSTITUTE
4707 Euclid Ave. **Cleveland 3, Ohio**

JUST OFF THE PRESS!

Send for YOUR COPY
of the New Spring DEPENDABOOK
today! Use YOUR letterhead please.

THE HARRY ALTER CO., INC.
1728 SO. MICHIGAN AVENUE CHICAGO 16, ILL.
134 LAFAYETTE STREET NEW YORK 13, N. Y.

SERVICE MEN: Don't Bother to Reface Frigidaire L/S Floats

USE ACME REPLACEMENT SEATS

Ask your Jobber or write

ACME PRODUCTS CO.
P. O. Box 1956
San Antonio 6 Texas

Service Men:

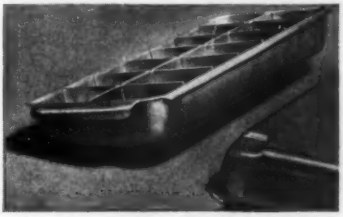
It is a good time now to stock up on valves that you will need later on.

Send your expansion valves to us for REPAIR or exchange.

Thermostatic Expansion Valves.....$3.00
Automatic Expansion Valves.....$1.75

CIRCLE VALVE REPAIR
327 So. LaSalle St., Chicago 4, Ill.

FOR SALE—10,000 NEW ALUMINUM ICE CUBE TRAYS IN 3 POPULAR SIZES



Also air-cooled and water-cooled re-manufactured condensing units in sizes from ¼ to 2 H.P.

Write for Particulars

EDISON COOLING CORP.
310 E. 149th St. New York 51, N. Y.

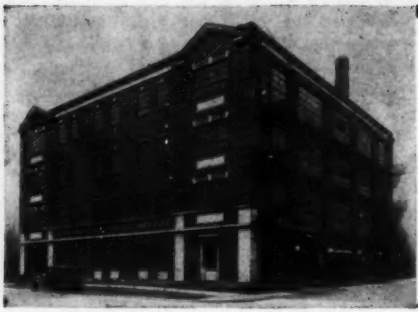
It's the* PLUS *Value that Counts!

• Full value of a product is not always reflected in the quality of that product or the price paid.

Plus Value is made up of a lot of little things. Things like courteous treatment—dependable service—the guarantee of satisfaction—and the feeling your business is *wanted* and *appreciated.*

These are the hidden values that count . . . they are the hidden values that go with each purchase from KRAMER'S.

FRED C. KRAMER COMPANY
212 N. JEFFERSON ST., CHICAGO 6, ILL., RANDOLPH 6288
Member Refrigeration Equipment Wholesalers Association



TRAIN WHERE THE ARMY TRAINED

Learn Domestic and Commercial Refrigeration and Air Conditioning Maintenance & Service.

Full or part time Residence course or Combination Home Study & Shop training.

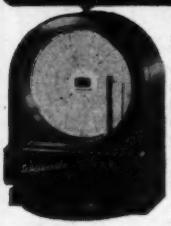
VETERANS - Commercial Trades Institute is approved for GI training

Write for free Descriptive booklet

COMMERCIAL TRADES INSTITUTE

1400 Greenleaf Ave. CHICAGO 26, ILLINOIS

For *TEMPERATURE
For *MOTOR OPERATION
2 Recorders* For Less Than The Price of One



The TEMPSCRIBE Recorder is outstanding for its universality. Any TEMPSCRIBE can be quickly converted from temperature recording to time-operation recording simply by changing the door of the instrument. A widely-used combination comprises one clock case (having a 24-hour spring-wound movement) and two doors (one with a bi-metallic temperature element, and one with mechanism for recording motor on-and-off time). This economical set costs very much less than a dual recorder. Even two complete TEMPSCRIBES, to obtain simultaneous records of temperature and motor operation, cost no more than you would normally expect to pay for a single instrument that makes dual records, yet give you all the advantages of two separate instruments!

Bulletin 704 gives list of ranges, practical application data, and complete details.

Ask Your Wholesaler, or Orders Filled Direct.

BACHARACH Industrial Instrument Co.

7000 BENNETT STREET · PITTSBURGH 8, PA.

PARTS & TOOLS

For Refrigeration Servicemen

Parts and tools you need now may be available from our ever increasing stock. We offer our assistance to you in getting what you need.

Our business is to serve you in your business

H. W. BLYTHE COMPANY

2334 So. Michigan Ave. Chicago 16, Ill.

CONTROLS—VALVES

REPAIRED OR EXCHANGED

We completely disassemble controls, clean, test, check and replace defective or broken parts, and set for proper temperatures.

Domestic Cold Controls (Modern)	$2.50
Commercial Controls (Pres. or Temp.)	2.75
Automatic Expansion Valves	1.75
Thermostatic Expansion Valves	3.00
Automatic Water Valves	3.00

90 day guarantee ★ Prices F.O.B. Chicago

Refrigeration Control Service

4840 S. Springfield Ave., Chicago 32, Ill.

COMPRESSOR REPLACEMENT SERVICE

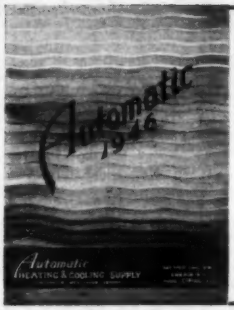
Immediate delivery on a replacement schedule for over 125 compressors. Shipment of a replacement compressor can be made the same day yours is received. Most standard models available for this service. 90 day guarantee—Reasonable prices.

We do not repair hermetic units.

For quotations, 'phone ALBany 1703 or Write

KEYSTONE ENGINEERING CORP.

4140 CHICAGO AVE. CHICAGO 51 ILL.



YOUR CATALOG IS READY

REFRIGERATION men find this convenient catalog a necessary part of their business.

Prices are maintained up-to-the-minute by sending you revised discount sheets when prices change.

WRITE FOR YOUR COPY ON YOUR LETTERHEAD

AUTOMATIC HEATING AND COOLING SUPPLY

647 W. LAKE ST.
809 W. 74th ST.
Division of Weil-McLain Co.
CHICAGO 6, ILL.

In the West It's

REFRIGERATION SERVICE INC.

Pacific Coast Supply Jobber Since 1928

Your letterhead will bring our latest catalog—also our House Organ,

"The Liquid Line"

RS INC.

3109 Beverly Blvd.
LOS ANGELES 4, CALIF.

Your refrigeration—heating—air conditioning equipment and supply jobber in

EASTERN IOWA
WESTERN ILLINOIS

In the Refrigeration Business Since 1920

REPUBLIC ELECTRIC COMPANY

116 E. First St. Davenport, Iowa
Phone: 2-4205

SAVE YOUR TIME BUY BY MAIL

Mississippi dealer writes:

"Airo Supply made easier the problems of purchasing scarce items. We appreciate the efforts you spent in obtaining difficult goods and passing them on to us.

"Thanks a million for the speed and accuracy and careful consideration you gave each order, large or small, through the past year."

Air Conditioning and Refrigeration
Parts - Tools - Supplies
Shop Equipment

Request Catalog on Your Letterhead

AIRO SUPPLY CO. INC.
SERVICE COVERS THE NATION
2752 N. ASHLAND
CHICAGO 14, ILL.
Dept. A

ESTABLISHED IN 1929

THE SEAL OF GOOD SOLDERING
TINIT
CLEANS AND TINS METAL IN ONE OPERATION
TO SOLDER—TIN-IT FIRST

Registered U.S.A.-Canada

Factory:
1635-39 Platte St.

TINIT

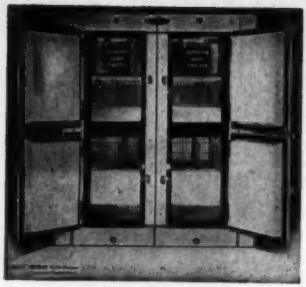
SOLDERING COMPOUND

PENETRATES RUST, PAINT AND GREASE.
TINS STAINLESS STEEL,
GALVANIZED AND BLACK IRON.
CLEANS AND TINS BY SIMPLY APPLYING HEAT.

Sold Through Automotive, Refrigeration Service, Etc. Jobbers.

Used by Army and Navy.

TINIT MFG. CO.
BOX 794, DENVER 1, COLO.
TO SOLDER—TIN-IT FIRST



Wilson ZEROSAFE

Wilson ZEROSAFE Is Years Ahead

SINCE 1939 Enthusiastic public acceptance and constant daily use have proved Wilson ZEROSAFE the greatest Reach-In Farm Freezer in America. These years of trouble-free ZEROSAFE service are your guarantee that the new ZEROSAFE, now greater than ever before, will continue to revolutionize American eating habits by making frozen fresh foods a part of daily living.

There is a ZEROSAFE size for EVERY need. Self-Contained Models are of 15 and 25 cu. ft. capacities; Sectional Models from 22 cu. ft. to 120 cu. ft. Model illustrated is FF-44.

For franchise information address Desk 15

WILSON REFRIGERATION, INC.
SMYRNA DELAWARE

C-Leak

INSTANT PRESSURE LEAK DETECTOR

Detects pressure leaks immediately upon application to tested area. Especially valuable in the location of leaks in valves and joints. Completely safe. Will not react with hydrogen acetylene or any of the gases used in refrigeration systems. No additional equipment necessary.

economical

easy to use

4 OZ. TRIAL SIZE, 35c AT YOUR WHOLESALER

CHEMICAL SUNDRIES CO., INC
Chicago 16, Illinois

READY NOW

Write for our new 1947 Refrigeration and Electrical Parts Catalog.

G. & E. EQUIPMENT SUPPLY CO.
400 N. Sangamon St.
Chicago 22 Illinois

GASKETS

GASKETS

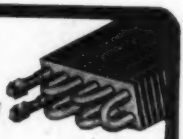
• Play safe and specify CHICAGO-WILCOX gaskets for every refrigeration need. Our complete gasket service provides a dependable source of supply to meet your requirements. Get full details today.

Write for complete catalog.

CHICAGO-WILCOX MFG. CO.
7701 Avalon Ave. Chicago 19, Illinois

Rempe

FIN COILS
ALL SIZES—ANY MATERIAL—
ANY LIQUID OR REFRIGERANT
Custom Built Fin Coils for Air Conditioning or Sub-Zero Freezing



★ ★ ★

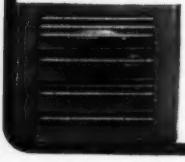
OVERHEAD BLOWER UNITS
for low temperature cooling—complete line

★ ★ ★

PIPE COILS—ANY STYLE—ANY TYPE

★ ★ ★

Catalogs available if request made on business letterhead
Send us your special problems



REMPE COMPANY, 358 N. Sacramento Blvd., Chicago 12, Illinois

COLD CONTROLS & EXPANSION VALVES

repaired or exchanged

at the following prices, F.O.B. Chicago

Automatic Expansion Valves (All Makes)	$1.75
Thermostatic Expansion Valves	3.00
Automatic Water Valves	3.00
Domestic Cold Controls (Modern Type)	3.00
Commercial Controls (Temp. or Pressure)	2.75
Commercial Dual Controls	3.50

ALL WORK GUARANTEED FOR 90 DAYS

NEW DUTY

2424 Irving Park Blvd., CHICAGO 18, ILL.

CONTROL REPAIR SERVICE

Power elements and domestic controls reconditioned equal to new at a small cost. All work guaranteed for one year. Prices upon request.

United Speedometer Repair Co.
342 W. 70th Street
New York City 23

WE HAVE SERVED — LET US SERVE YOU

VALVES REBUILT

APPEARANCE AND OPERATION LIKE NEW FACTORY ADJUSTMENT

Automatic Expansion Valves	$1.75
Thermostatic Expansion Valves	3.00
Automatic Water Valves	2.50
Domestic Cold Controls	2.75
Commercial Controls (Pres. or Temp.)	2.75

90 Day Guarantee. Prices F.O.B. Chicago.

A-ABCO VALVE SERVICE

4110 N. Pulaski Rd. Chicago 41, Ill.

Owned and Operated by Veterans

IMMEDIATE DELIVERY

Quality bobtail fountains; reach-ins, walk-in boxes—wood, metal; dough-retarders; double duty cases—stainless steel, porcelain; dairy, florist, bakery cases; ice cream hardening cabinets; thermopane frozen food cases; milk, sandwich coolers; stainless steel back bars; with or without machines. Our custom department will build to your specifications any special cabinet. Inquire—photographs sent on request.

FRIGITEMP CORP.

MA 2-9093

931 Bergen St. Brooklyn 16, N. Y.

Classified Ads

Rate: $2.50 for fifty words or less, 40 cents for each additional ten words or less.

FOR SALE—1000 new flip covers and frame assemblies, for freezer and ice cream cabinets. Two popular sizes. ¼ to 2 h.p. NEW AND REMANUFACTURED CONDENSING UNITS. Also new aluminum ice cube trays. Write for particulars. Edison Cooling Corp., 310 E. 149th St., Bronx 51, N. Y.

NEW COILS AT BIG SAVINGS—Betz, Drayer-Hanson, Recold, Krack. All types, all motors, factory warranty. Example of savings: Nationally popular coil, 4700 b.t.u. 10° T.D., dealer price $121.00 net, our price $106.00. Similar savings on all makes and models. Witt Coils, 767 E. Pico Blvd., Los Angeles, Calif.

WANTED — Young man desires a position in installing and repair work preparatory to entering engineering college. Graduate of high school and accredited refrigeration and air-conditioning school. Excellent references. Philadelphia metropolitan area preferred. Address: Box MR-3, THE REFRIGERATION SERVICE ENGINEER, 433 N. Waller Ave., Chicago 44, Ill.

WANTED—Large Refrigeration Organization has opening for service men. Must have at least 6 years actual field experience and be able to handle air-conditioning and commercial service. Must have own car, full set of tools. $1.95 per hour and time and one half for overtime. Can be kept busy year around with excellent earning. Address Box JA-6, The Refrigeration Service Engineer, 433 N. Waller Ave., Chicago 44, Ill.

POSITION WANTED—Refrigeration Service Engineer—10 years experience from service man to owner and operator of independent service company employing five men doing commercial and domestic sales, service and installation. Interested in commercial refrigeration and air conditioning. Age 35. Married. One child. Desires employment in South or Southwest. Reply Box MR7, THE REFRIGERATION SERVICE ENGINEER, 433 N. Waller Ave., Chicago 44, Ill.

WANTED—Have opening in our organization for an experienced, live-wire serviceman, capable of handling commercial service only. If you have the ability to come up to our requirements, we have the job for you. Salary to start—$75.00 a week. The rest is up to you. Salary guaranteed year around. Truck furnished. This is a good town to live in and we will help you get located. Company operates the finest commercial set-up in the Middle West. We will be glad to give you any further information if interested. T and R Supply Co., Inc., Kankakee, Ill.

WANTED
Refrigeration Engineer

Old West Coast Commercial Refrigeration Manufacturer has opening for Engineer to operate research and testing laboratory. Permanent position for proper applicant. Write giving full details of qualifications and salary expected.

Address Box MR-2
The Refrigeration Service Engineer
433 N. Waller Ave., Chicago 44, Ill.

Index to Advertisers

A-Abco Refrigeration Service....103
Ace Ice Cream Cabinet Co.... 97
Acme Products Co.... 99
Aerovox Corp.... 81
Airco Refrigeration Parts.... 98
Airo Supply Co....101
Airserco Manufacturing Co., Inc.... 18
Alco Valve Co.... 17
Alter Co., The Harry.... 99
Ansul Chemical Co.... 1
Automatic Heating & Cooling Supply Co....101
Automatic Products Co....52 and 53

Bacharach Industrial Instrument Co....100
Barksdale Compressor Service.... 96
Ben Hur Mfg. Co.... 81
Betz Corp.... 14
Blythe Co., H. W....100
Boston Technical Institute.... 98
Brunner Manufacturing Co.... 19
Bush Manufacturing Co.... 21

Capacitron Co., The.... 8
Chase Refrigeration Supply Co.... 97
Chemical Sundries Co., Inc....102
Chicago Seal Co....Inside Front Cover
Chicago-Wilcox Manufacturing Co....102
Circle Valve Repair.... 99
Commercial Trades Institute....95 and 100
Conservative Gas Corporation
(Modern Gas Division).... 95
Cutler Hammer, Inc.... 12

Davison Chemical Corp....Inside Back Cover
Day & Night Mfg. Co. (Refrigeration Div.).... 93
Detroit Lubricator Co....2 and 3
Du Pont de Nemours & Co., E. I.
(Electrochemicals Dept.)....4 and 5

Ebco Mfg. Co., The.... 83
Edison Cooling Corp.... 99
Electrimatic.... 59

Fine Products Co.... 87
Frigitemp Corp....103

G & E Equipment Supply Co....102
Generals Controls.... 97
Grunow Authorized Service, Inc.... 91

Hasco, Inc.... 97
Heat-X-Changer Co., Inc.... 89
Henry Valve Co.... 57
Highside Chemicals Co.... 75

Imperial Brass Mfg. Co.... 9

Jamison Cold Storage Door Co.... 77
Jarrow Products.... 95
Johnson Electric.... 94

Kelvinator (Div. of Nash-Kelvinator Corp.).... 16
Keystone Engineering Corp....100
Kinetic Chemicals, Inc.... 26
Kold-Hold Manufacturing Co.... 23
Kramer Co., Fred C.... 99
Kramer-Trenton Co.... 61

Lehigh Mfg. Co., Inc.... 67
Lynch Mfg. Corp.... 7

Marsh Corporation, Jas. P.... 22
McIntire Connector Co.... 10
Mills Industries, Incorporated.... 73
Modern Design Products Co.... 79
Mueller Brass Co.... 13

New Duty....103

Paragon Electric Co.... 79

Peerless of America, Inc.... 11
Penn Electric Switch Co.... 63
Premier Co., The.... 87

Rahco, Inc.... 24
Refrigeration Control Service....100
Refrigeration Service, Inc....101
Rempe Co.... 102
Republic Electric Co....101

Sanitary Refrigerator Co.... 85
Sealed Unit Parts Co.... 89
Servel, Inc.... 104
Service Parts Co.... 96
Shank Co., Cyrus.... 91
Skasol Corp.... 55
South Bend Lathe Works.... 20
Sporlan Valve Co.... 28
Standard Refrigeration Co....Back Cover
Superior Valve & Fittings Co.... 83
Supreme Mfg. Co.... 98

Temprite Products Corp....65 and 94
Thermal Co., Inc.... 93
Tinit Mfg. Co....101
Tudor Chemical Specialties, Inc.... 93

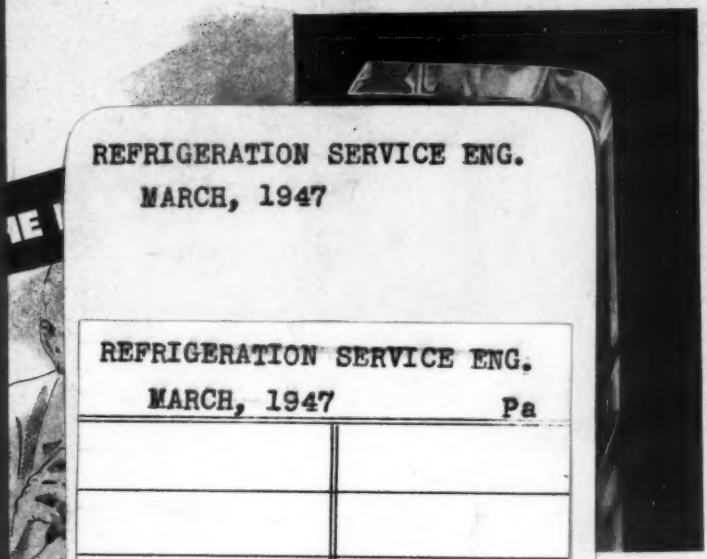
United Speedometer Repair Co....103
Utilities Engineering Institute.... 91
Utility Thermostat Co.... 98

Virginia Smelting Co.... 6

Wabash Mfg. Co.... 71
Wagner Electric Corp.... 69
Wagner Products Co.... 85
White-Rodgers Electric Co.... 15
Wholesale Refrigeration Repair Co.... 98
Wilson Refrigeration, Inc....102

means reserve power to meet peak load demands. Use genuine Servel parts to maintain top efficiency. Call your local Servel distributor or authorized parts jobber.

Electric Refrigeration Division **SERVEL, Inc.** **Evansville 20, Indiana**



REFRIGERATION SERVICE ENG.
MARCH, 1947

REFRIGERATION SERVICE ENG.
MARCH, 1947 Pa

PUBLIC LIBRARY
DETROIT, MICH.

PARKMAN BRANCH

The number of books that may be drawn at one time by the card holder is governed by the reasonable needs of the reader and the material on hand.

Books for junior readers are subject to special rules.

L. E. C. 1011R

Progress Through Chemistry

BALTIMORE-3, MD.

PIONEERS AND DEVELOPERS OF SILICA GEL

...dian exclusive sales agents for DAVISON SILICA GEL:
CANADIAN INDUSTRIES LIMITED, General Chemicals Division

ADAPTABILITY!

STANDARD

Model JS

EVAPORATORS

WITH

HORIZONTAL REFRIGERANT PASSAGES AND UNIVERSAL MOUNTING BRACKETS INCREASES THEIR

ADAPTABILITY

TO THOUSANDS OF INSTALLATIONS

USE **STANDARD**

HEAT TRANSFER APPLIANCES

YOUR REFRIGERATION SUPPLY WHOLESALER HAS TI

Standard Refrigeration C

20 North Wacker Drive Chicago 6, Illi